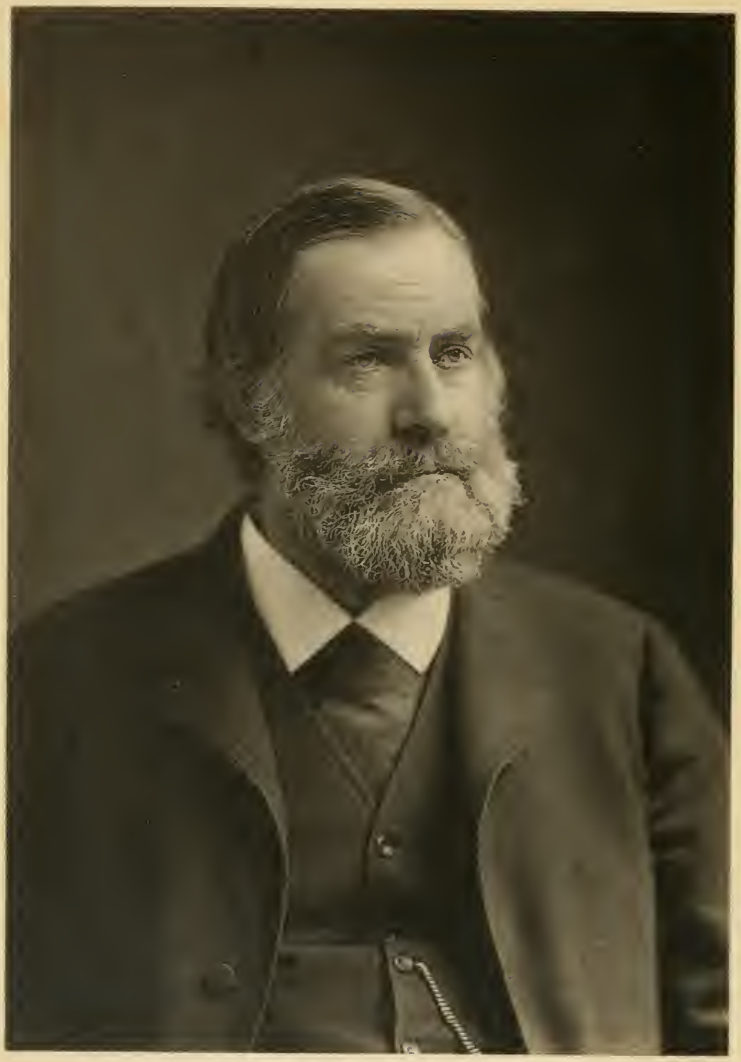

Joseph Leidy

A SKETCH

OF THE LIFE OF

JOSEPH LEIDY, M.D., LL.D.

BY

W. S. W. RUSCHENBERGER, M.D.

REPRINTED APRIL 25, 1892, FROM PROC. AMER. PHILOS. SOC., VOL. XXX.

PHILADELPHIA:
MACCALLA & COMPANY,
237-9 DOCK STREET.
1892.

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JOSEPH LEIDY, M.D., LL.D.

(*Read before the American Philosophical Society, April 1, 1892.*)

The Academy of Natural Sciences, of Philadelphia, devoted the stated meeting of May 12, 1891, to commemorate its President, Dr. Joseph Leidy, who died April 30. The meeting was very large and impressive. Drs. William Hunt, Harrison Allen, Henry C. Chapman, James Darrach, Edward J. Nolan, Prof. Angelo Heilprin and Mr. Joseph Wilcox, by appointment, delivered appropriate addresses; and the Rev. Dr. H. C. McCook, Mr. Isaac C. Martindale, Dr. James J. Levick and others eulogized the dead President.

A more affectionate tribute has seldom been paid in this city to the memory of a votary of science. Ample testimony was adduced that Dr. Leidy had attained distinction among scientific men at home and abroad, and that he had the warm sympathy and respectful regard of all those members of the Society with whom he had been in any degree associated.

In the first hours, while a great bereavement is still fresh, love and admiration so obstruct perception that the extent of the loss sustained may be sometimes overstated. But let whoever may conjecture that in this instance some of the addresses were too fervid, consult the cold records of the Academy in which are faithfully set down his works since he entered the Society, and he will find that they justify the encomiums pronounced.

Loyalty to truth and ingenuousness were shining features of Dr. Leidy's nature.

The first paragraphs of Dr. William Hunt's opening address on Dr. Leidy's personal history are cited here in illustration:

"It is fitting that we imagine the beloved subject of our discourses this evening to be with us in spirit, as he doubtless is in influence, and to let him introduce himself as I heard him do in Association Hall some years ago when he was about to give a popular lecture. I was unexpectedly called upon to introduce him. 'What!' said I. 'Who is to introduce the introducer? Here's a man more widely known to the city and to the world than any of us.' Dr. Leidy, hearing the conversation, said: 'Oh!

Dr. Hunt, keep your seat; I don't wish to be introduced; I'll introduce myself.' And, stepping to the rostrum, he spoke in this way:

"'My name is Joseph Leidy, Doctor of Medicine. I was born in this city on the 9th of September, 1823, and I have lived here ever since. My father was Philip Leidy, the hatter, on Third street above Vine. My mother was Catherine Mellick, but she died a few months after my birth. My father married her sister,* Christiana Mellick, and she was the mother I have known, who was all in all to me, the one to whom I owe all that I am. At an early age I took great delight in natural history and in noticing all natural objects. I have reason to think that I know a little of natural history, and a little of that little I propose to teach you to-night.'"

Dr. Leidy's ingenuous introduction of himself suggests that a fuller account of his ancestors may be acceptable.

Carl Leidy, the forefather of the American-born Leidys, came to America from Rhenish Germany in the early part of the eighteenth century (about 1724), and settled in that part of Penn's province which now includes Montgomery and Bucks counties, Pa.†

**Erroneous.*—His mother died May 28, 1825 (soon after her son Thomas was born), twenty months after the Doctor's birth. His father's second wife was a cousin and not a sister of Dr. Leidy's mother, as stated. See, The Story of an Old Farm, or Life in New Jersey in Eighteenth Century. By Andrew D. Mellick, Jr., Somerville, New Jersey, 1889.

†*Genealogical Notes.*—Carl Leidy's son, Carl Ludwig, b. Dec. 30, 1729, and his wife, Ursula Elizabeth, b. Feb. 8, 1734, had issue: (1) John Jacob, b. Nov. 7, 1753; (2) George Heinrich, b. Oct. 19, 1755; (3) Margaretta, b. Nov. 15, 1757; (4) Eva Christina, b. Dec. 25, 1759; (5) Anna, b. Oct. 1, 1761; (6) Magdalena, b. Dec. 18, 1763; (7) Carl, b. Aug. 20, 1765; (8) Anna Maria Elizabeth, b. Feb. 24, 1768; (9) George Ludwig, b. July 1, 1770; (10) Maria Catherine, b. May, 1772. Both parents and children were natives of Hilltown township, Bucks county, Pa.

John Jacob Leidy, the first-born of this family, m. April 18, 1777, Catherine, b. March 16, 1757, a daughter of Christian Comfort. They had issue: (1) Charles Ludwig, b. Jan. 7, 1778; (2) Henry, b. Jan. 12, 1779; (3) Catherine, b. May 16, 1780; (4) Maria Margaretta, b. March 1, 1781; (5) Jacob, b. Jan. 10, 1782; (6) Christian, b. Jan. 3, 1784; (7) George, b. Oct. 7, 1786; (8) Conrad, b. Nov. 25, 1788; (9) Philip, b. Dec. 5, 1791, d. Oct. 9, 1862; (10) Emanuel, b. Dec. 22, 1794; (11) Frances Fanny, b. March 6, 1798. All were natives of Hilltown township, Bucks county, Pa.

Philip Leidy, the ninth child of the preceding family, m. Oct. 6, 1818 (he was then settled in Philadelphia), Catherine, a daughter of Peter and Rachel Mellick. She was born in Bloom township, Columbia county, Pa., Jan. 27, 1790, and died in Philadelphia, May 28, 1825. They had issue: (1) Peter, b. Dec. 28, 1819, d. Aug. 29, 1820; (2) Catherine, b. Aug. 7, 1821, d. Nov. 20, 1822; (3) Joseph, b. Sept. 9, 1823, d. April 30, 1891; (4) Thomas, b. May 21, 1825, d. April 20, 1870.

Philip Leidy m., May 25, 1826, Christiana Taliana, a cousin of his first wife. She was born in Philadelphia, July 29, 1797, and died Jan. 6, 1881. They had issue: (1) Christiana

The name first appears in the City Directory for 1809—"Leidy, Jacob, shoemaker, 9 Summers' Court." Prior to that year the Leidys probably lived either in Bucks or Montgomery county. All of them who exchanged a country for a city residence were of the class called "plain people," composed of well-to-do and respectable workers—men whose individual energies when united constitute the national strength and are almost exclusively the progenitors, in aftermaths, of millionaires, consequently of aristocratoid or "first families" and gentry, often more boastful of ancestry than of creditable achievement. The name of Philip Leidy, hatter, the father of our subject, first appears in the City Directory for 1817, and that of his brother, Conrad, bootmaker, in 1820. At those dates they were established in business. During several years before that time they resided in the city. Both volunteered in the War of 1812-15 against Great Britain and served with those at Camp Du Pont. The Leidys named in the City Directories for 1809 and for several years thereafter were mostly mechanics, makers of hats, boots, chairs, etc., and probably had been apprentices and learned their trades in the city. One of their contemporaries, now an influential citizen advanced in years, remembers that "all the Leidys were smart."

Philip Leidy, who was born in Montgomery county, Pa., December 5, 1791, is spoken of as a powerful man whose stature was rather more than six feet and in every way well proportioned. Though not conspicuous for mental force he was naturally endowed with practical good sense. His educational acquirements were limited; but his industry, honesty and frank deportment secured him confidence and respect wherever he was known. He made and sold hats, did a good business, and had many customers from the adjoining counties as well as in the city. He was a member of the German Lutheran Church in New street, and with his family habitually attended its services.

Dr. Leidy said in his self-introduction, every word in a halo of grateful

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T., b. Feb. 22, 1827, m. June 4, 1839, James Cyrus Umberger, d. Oct. 24, 1878; (2) Francis, b. Dec. 14, 1828, d. June 3, 1856; (3) Asher, b. July 30, 1830, d. July 6, 1878; (4) Helen, b. Sept. 30, 1833, d. Dec. 3, 1839; (5) Catherine Mellick, b. March 28, 1837, d. Aug. 12, 1839; (6) Philip, b. Dec. 29, 1838, d. April 29, 1891. All born in Philadelphia.

Peter, the forefather of the Mellick family, came to America from Rhenish Germany about the close of the sixteenth century (1695).

German and English, it may be said, were vernacular languages to the members of the Leidy and Mellick families generally—the German came to them as a birthright, and English from their environment.

love, my stepmother "was the only mother I have known, who was all and all to me, the one to whom I owe all that I am."

Besides being notable in the management of domestic affairs, she possessed a large share of tact and of good womanly qualities. She was intellectually the superior of the family, had literary taste, wrote verses sometimes, was ambitious, and desired that her children should be well educated and that her sons should study the professions.

Through her influence Joseph, at the age of about ten years, was sent to the Classical Academy, a private day-school conducted by the Rev. William Mann, a Methodist clergyman. There he studied English and read Latin—Historia Sacra, Viri Romæ and Virgil—the principal being scrupulously careful that his pupils should understand the grammar. Probably he began Greek also.

Minerals and plants interested him at an early age. Mr. Mann encouraged the cultivation of this taste. One day an itinerant lecturer from the so-called "Universal Lyceum" visited the school, and, by permission, discoursed about mineralogy, illustrating his lesson with specimens. Young Leidy was so much interested that soon after he procured books on mineralogy and botany and diligently studied them. At length he became so fascinated in the pursuit that he often absented himself from school without leave to seek specimens in the rural districts near the city. Parental chidings for delinquencies of this kind did not always restrain him. His self-will and eagerness to hunt for minerals and plants often caused him to forget those admonitions and follow the inclination of the hour.

The conduct of the boy, his spontaneous ways, are in many instances forecasts, in outline, of the characteristic features of the man he will become; and therefore it is interesting to observe those surroundings which may influence their development.

At the time Joseph entered the academy, Mrs. Burris, a respectable colored woman, a widow, lived near and did laundry work for support. Her son, Cyrus, a bright youth a few years older than Joseph, was errand boy in the hatter's shop. His chief duty was to deliver hats at the homes of their purchasers, and for each errand of the kind he received six or twelve cents, according to the distance he had to walk.

There were then three schools at no great distance apart. Mr. Collom and Mr. Livensetter charged three dollars a quarter for each pupil and Mr. Mann twelve dollars. The boys of the two schools were at war with

those of the academy, and they had a fight whenever they met in the street.

Apprehensive that her son might be assaulted by some of those "rowdy boys," Mrs. Leidy engaged Cyrus to accompany him to school. These two became intimate friends and often went together botanizing.

Cyrus Burris is now a well-preserved man, of pleasant deportment, and of more than seventy-five years of age. He is intelligent and has a retentive memory.

In answer to questions, Cyrus related substantially that Mr. Leidy once took all his family for a picnic out where Fortieth and Baring streets are now, and he went with them to carry things and be useful. At that time plenty of weeds grew on the side of the hill. They at once attracted the young professor, who found that he did not know any of them. But Cyrus, who had been brought up in the country, near Burlington, N. J., had there learned to know and name the herbs and weeds in his neighborhood, was able to tell him the names of many of them. This show of superior information pleased him so much that afterwards Cyrus was his chosen companion on botanical excursions.

His favorite hunting ground was along the banks of the Schuylkill and Wissahickon. On the way, on one of their early walks, they strolled into Mr. Henry Pratt's famous grounds at Lemon Hill. The late Mr. Robert Kilvington, a practical and proficient botanist, then had charge of the hothouses and garden. He noticed Leidy, and kindly answered his questions, regarding him as a poor, intelligent boy who was striving to instruct himself. This was the beginning of an enduring friendship. In a short time Mr. Kilvington cheerfully assumed to be his systematic instructor, and, after his pupil had become distinguished, complacently mentioned to friends that he had been Leidy's botanical preceptor.

On one occasion Cyrus and the young professor spent a whole day in Bartram's garden, near Gray's Ferry, and did not reach home till night.

"The professor," as Cyrus styled him, "used to say that the valley of the Wissahickon was the best place in the neighborhood to find plants. He very soon knew more about them than I did. Sometimes we went all day with nothing to eat but raw turnips we got out of the fields, for the old man was stingy of spending-money to his boys, though he was always a bountiful provider of the very best things in the market for them at home. Once we went into Jersey, and that was the only time I ever cheated the professor. We saw in a thick bush a big snake, four or five

feet long, with a white spot under his throat. The professor wanted to catch him, so he gave me a carpet bag to hold open on one side of the bush for the snake to run into, while he frightened him out from the other. The snake came hissing along towards me. I jumped aside—I couldn't help it—and let him get away, but I never let on that I was scared."

In the course of his schooldays the young naturalist, besides gathering stones and plants, caught butterflies and bugs, which he pinned in a box prepared for the purpose, to be arranged in his cabinets at home.

Cyrus stated, among other things, that he sometimes acted as caterer and waiter for the lads on special occasions; and that whenever the boys came into the hatter's shop, their father always talked to them in German. He also said that Dr. Leidy had taught him a great deal about plants and their medicinal uses, adding, "Through what I learned from him, I have been able through many years to make a decent living."

The offspring of almost constant companionship during their boyish days, at home or in the fields, was a personal sympathy, a friendship which, to the credit of both, was life-long, notwithstanding the extreme difference and distance between the social places each occupied in adult age. The professor gave him, at different times, several books on medicine, and among them his *Elementary Treatise on Anatomy*, in which is written, "To Cyrus Burris, from his old friend, the author." These are Cyrus' treasures. He quietly but, no doubt, proudly shows them to a favored few.

The future professor did not own shinny or hockey stick, kite, skates nor ball; never played marbles, nor whistled nor hummed a tune at any time.

He was a good boy in school, always neat and tidy, and never joined his schoolmates in their out-of-door sports during the hour of daily "recess," but sat the while at his desk, pencil in hand, portraying some natural object, as a snail shell, carefully and beautifully shading it, or drawing caricatures suggested by acts of his fellow-pupils.

He had no teaching to develop this talent. The high artistic skill which he acquired was exclusively due to self-cultivation. A small book of his portraits of shells, dated February, 1833, has been preserved, which show his skill with a pencil in his tenth year.

According to his school champion, who, the boy always declared was the best Greek scholar in the academy, "Joseph Leidy never sized up to the other boys."

His schooldays ended in his sixteenth year, probably about the last of July, 1839.

His worldly condition required that he should now be taught some art by which to earn a livelihood. As he had manifested at an early age uncommon aptitude in draughting and drawing, his father conjectured that he would best succeed as a sign painter. But the son, who had passed much of his leisure in the wholesale drug store of his cousin, Napoleon B. Leidy, M.D., "physician and druggist," as the City Directory styled him, fancied that he would rather be an apothecary.

In compliance with his preference he was placed with an apothecary and in the course of a few months acquired such a degree of knowledge of drugs and the method of compounding them, that he was considered qualified to be left in temporary charge of the retail business.

His loving stepmother, however, was not satisfied. She seemed sure that there was in him the making of a successful physician. Her arguments at last prevailed. With the consent of his father, rather reluctantly given, it was agreed that he should study medicine.

In the autumn of 1840, he became a pupil of Dr. James McClintock, then a private teacher of anatomy in College avenue. His father's proposition to pay the preceptor's fee in hats was accepted, but the settlements provoked dispute and at last estrangement of the parties.

Parts of 1840 and 1841, more than a year, were devoted to practical anatomy under the able instruction of Dr. McClintock. During the first half of 1841 he parted from Dr. McClintock, who, having accepted the office of Professor of Anatomy in the Castleton Medical College, in Vermont, removed from Philadelphia in 1842.

Leidy matriculated at the University, October 26, 1841, and was under the instruction of Dr. Paul B. Goddard, then Demonstrator of Anatomy in the University and Prof. Horner's prosector. He was a promising surgeon, a man of bright qualities. In conjunction with Mr. Robert Cornelius he was the first in Philadelphia to make a daguerreotype. He devoted his leisure evenings in his office, with a few intimate friends, to microscopic studies, and there young Leidy received his first lessons in the use of the microscope.

Having attended three courses of lectures and submitted a thesis on *The comparative anatomy of the eye of vertebrated animals*, the degree of Doctor of Medicine was conferred upon him, April 4, 1844, by the University of Pennsylvania.

In the year after graduation, he was an assistant in the laboratory of Dr. Robert Hare, Professor of Chemistry, during six weeks, and then entered that of Dr. James B. Rogers, lecturer on Chemistry in the Medical Institute of Philadelphia, from 1841, and remained there through the summer course. On the retirement of Dr. Hare, in 1847, Dr. Rogers succeeded him in the University.*

He was now prepared to begin the practice of any branch of medicine he might prefer, but he had yet to learn how to make the profession of commercial value to himself. No plan of proceeding was immediately formed. In August, 1844, on foot with several companions, he visited Harvey's lake, Bethlehem, Mauch Chunk; also the Beaver Meadow and Hazleton coal mines. In a letter to a sister he wrote: "Pedestrianated to Wilkesbarre and arrived at Berwick yesterday, August 28, having walked from the lake to this place, thirty-five miles, the longest distance I have ever walked in one day."

In the autumn he opened an office, No. 211 North Sixth street, hoping to obtain employment as a general practitioner. But the business which came to him during two years' trial did not promise a satisfactory living, and therefore he determined to devote himself exclusively to teaching. Possibly his failure to obtain practice was ascribable in some degree to lack of due attention to patients. Years after this time, to show how intently attractive comparative anatomy was to him, he related to his private class that on one occasion he was so absorbed in his office studying the anatomy of a worm that he totally forgot that he had been called to an obstetric case which he had engaged to attend. Later in life he would have felt that unbridled eagerness to learn the structure of a worm is an inadequate plea for forgetting a professional or other engagement.

An unhappy experience, which occurred shortly after he began the practice, tended to disgust him with it and may have been one reason among others why he abandoned it. Ten years afterwards he narrated substantially that, called to a child suffering "with all the symptoms of tubercular meningitis," he informed the parents that medicine in such a case is inefficacious. Nevertheless, they requested him to visit it. At

* Biographical Notice of Joseph Leidy, M.D. By the Editor. "The New Jersey Medical Reporter and Transactions of the New Jersey Medical Society." Edited by Joseph Parrish, M.D., Burlington, N. J. Published by S. W. Butler, M.D. Ninth month, September 30, 1853, Vol. vi, No. 2. It is understood that this notice had the approval of Dr. Leidy.

the end of a week a much older practitioner was called, and attended the child till it died. He then "informed the parents that he could have saved the life of the patient had he been called at the time of Dr. Leidy's first visit." *

In 1845, on the resignation of Dr. Goddard and the appointment of Dr. John Neill, Demonstrator, in his place, the Professor of Anatomy, Dr. Horner, appointed Dr. Leidy his prosector. In 1846 he was chosen Demonstrator of Anatomy in the Franklin Medical College, but resigned the office at the close of the session, in 1847, resumed his position with Dr. Horner and delivered to his students a private course of lectures on Human Anatomy.

He indulged himself with a short vacation in July, 1846, and visited his friends, Messrs. Haldemann, at Chickies, Pa.

While his kinsman, Dr. N. B. Leidy, was Coroner of the County of Philadelphia (1845-48), he acted as Coroner's Physician and received fees for the autopsies he made.

In the spring of 1848, impaired health induced Prof. Horner to visit Europe. He invited his friend, Dr. Leidy, to be his traveling companion. They sailed in April and returned in September. In England, Germany and France they "visited hospitals and anatomical museums, and sought out eminent anatomists and surgeons." Dr. Leidy witnessed in Paris, June 20, some vivisection experiments by Magendie, in his physiological laboratory, which interested him. They "were in Vienna while the revolutionary movements were in progress:" and "were also in Paris during the fierce conflicts from 23d to 26th of June; and during several days afterwards they "witnessed in the hospitals, filled with wounded, every variety of gunshot wound and the modes of treatment pursued."†

On his return from Europe, in the autumn, Dr. Leidy delivered a course of lectures on Microscopic Anatomy; and in the spring of 1849 began a

* See p. 16, Valedictory Address to the class of medical graduates of the University of Pennsylvania, delivered at the public commencement, March 27, 1858. By Joseph Leidy, M.D., Professor of Anatomy. Published by the Graduating Class. Collins, Printer, Philadelphia, 1858.

†A discourse commemorative of William E. Horner, M.D., Professor of Anatomy, delivered before the Faculty and students of the University of Pennsylvania, October 10, 1853. By Samuel Jackson, M.D., Professor of the Institutes of Medicine. Published by the Class, Philadelphia, 1853.

course on Physiology in the Medical Institute of Philadelphia, which the condition of his health required him to abandon.*

He edited *Qwain's Human Anatomy*, which was published June, 1849, by Lea & Blanchard.

An interesting event enabled Dr. Leidy to go abroad again under very favorable circumstances. Dr. George B. Wood, who was elected May, 1850, Professor of the Practice of Medicine in place of Dr. Nathaniel Chapman, resigned, desired to collect in Europe models, casts, preparations, etc., suitable for objective illustration of his future courses of instruction. Aware of the artistic judgment of Dr. Leidy, and of his recently acquired knowledge of localities in which objects adapted to his purpose could be purchased, Dr. Wood easily persuaded him to be his companion and assistant in hunting and selecting desirable specimens.

Dr. Wood had proved, while Professor of Materia Medica from October, 1835, till May, 1850, that placing before his class appropriate objects illustrative of his subject is superior, more successful than the purely oral and didactic method of instruction. For this reason he was confident that it would be equally useful, though perhaps more difficult to accomplish, in teaching that to which materia medica is merely subservient. With special reference to his intended system of instruction, he visited the most celebrated schools in Europe, and at a cost of many thousands of dollars, purchased models, castings and drawings of many pathological specimens. "These formed a cabinet of morbid representations unique in this country, and supplied material for a course of medical tuition which was as instructive and satisfactory as it was interesting and novel."†

Dr. Wood was the first to teach the practice of medicine in a series of "object lessons," by placing before his class models, casts, etc., appropriate to the illustration of each lecture.

At the end of his holidays in Europe, Dr. Leidy resumed his routine work in the University. He was elected a Fellow of the College of Physicians of Philadelphia, August, 1851. He seemed to be not much interested in the pursuits of the Society; seldom attended its meetings, and was not a contributor to its Transactions.‡ He was Secretary of the Committee on

* Sketch of Joseph Leidy. By Edward J. Nolan. *The Popular Science Monthly*, September, 1880. This sketch was read and approved by Dr. Leidy.

† Memoir of George B. Wood, M.D., LL.D. By S. Littell, M.D. (read October 1, 1879). Transactions of the College of Physicians of Philadelphia, Vol. xii, 1881.

‡ At a meeting of the College, May 5, 1886, he related that he had recently examined three nematoid worms, found in the intestines of young cats, sent to him from Chicago,

Lectures, under the Mütter Trust, from January, 1864, and kept a neat record of its proceedings. In November, 1883, "on account of his scientific achievements," the College exempted him from future payment of annual contributions.

He lectured on Physiology in the Medical Institute of Philadelphia in the summer courses of 1851 and 1852.

He was appointed in 1852 Pathologist to St. Joseph's Hospital, a purely nominal position.

Failing health had disabled Prof. Horner. With approval of the Trustees and the Medical Faculty of the University, Dr. Leidy, as his substitute, delivered the course of lectures on Anatomy for 1852–53.

Dr. Horner died March 13, 1853, and in May Dr. Leidy was elected Professor of Anatomy.

He was yet in the thirtieth year of his age. His educational opportunities and collateral advantages may have been less than those of his predecessor and friend, but from the hour he resolved to be a teacher he probably hoped some day to fill a Professor's Chair. The unremitting exercise of his natural abilities, his ever eager quest of knowledge enabled him to publish, prior to this time, many works which won for him praise and a name, and proved him to be an eligible candidate, and, after an unusual trial of his aptitude for the office, fairly secured his preferment.

A brief notice of his predecessors in the same Chair is submitted to show in what respects he resembled them.

The medical department of the University of Pennsylvania has always been happy in selecting men of marked ability and acquirements to fill its professorships. At the start the Trustees elected (September, 1765) two professors. Dr. John Morgan, to whom the credit of founding the Medical School of the University belongs, was appointed Professor of Medicine, which embraced the practice of physic, materia medica and pharmaceutical chemistry, and Dr. William Shippen, Jr., Professor of Anatomy and Surgery, when he was twenty-nine years of age. He also taught

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and read a letter from Durango, Mexico, reporting the great prevalence of scorpions in that district. He also exhibited "photographs of trichinæ in the flesh of the pig." In answer to a remark by a Fellow of the College that it had been repeatedly stated in Berlin that the trichinæ had been found there in the pig, prior to the time when Dr. Leidy announced his discovery of it, he said: "I believe mine was the first notice of the parasite occurring in the pig." *Transactions of the College of Physicians of Philadelphia*, third series, Vol. viii, 1886, pp. 41–43.

midwifery. Their first courses of lectures began in November, 1765. He was an eminent general practitioner of medicine and a surgeon of the Pennsylvania Hospital during nearly twelve years.

Dr. Caspar Wistar, at the age of thirty-one years, was appointed, January, 1792, adjunct, and after the death of Dr. Shippen, July 11, 1808, Professor of Anatomy.

Desirous to improve the method of teaching anatomy, Dr. Wistar had made gigantic models, exactly proportioned, of several minute and intricate structures—of the internal ear, for instance—which he used as objective illustrations of his lectures.

His collection of numerous models and anatomical preparations was presented, after his death, by his family to the University, and by resolution of the Trustees, styled "The Wistar Museum."

Dr. Wistar published, in 1811, *A System of Anatomy*, which was a text-book during many years. He was versed in botany, mineralogy and chemistry. He was a surgeon of the Pennsylvania Hospital more than sixteen years, and always among the most eminent and beloved practitioners of medicine in the community.

On the death of Dr. Wistar, January 22, 1818, Dr. John Syng Dorsey was appointed, but died November 13, 1818, a week after the delivery of his introductory lecture. The course on anatomy for 1818–19 was completed by Dr. Physick, with the assistance of Dr. William E. Horner.

Dr. Philip Syng Physick, an eminent surgeon, who had been Professor of Surgery from June 4, 1805, was elected Professor of Anatomy July 13, 1819, and resigned in 1831. He was a surgeon of the Pennsylvania Hospital for twenty-two years, and rendered important services to the public during the epidemics of yellow fever in 1793 and 1798.

Dr. William E. Horner was elected adjunct in 1820 and Professor of Anatomy in 1831. He was a native of Virginia, and had been a surgeon's mate in the Army of the United States from 1813 to March, 1815, and served on the Niagara frontier in the war of that period.

Dr. Wistar appointed him, March, 1816, his prosector, at an annual salary of $500.

From 1820 he was a surgeon of the Philadelphia Almshouse during twenty-four years. His private practice was large. In 1823 he published *A Treatise on Practical Anatomy;* in 1826, *A Treatise on the Special Anatomy of the Human Body*, in two octavo volumes, which passed through eight editions, and at different times contributed valuable papers to the medical journals.

The numerous pathological and anatomical preparations made by himself, which were appraised at $10,000, he bequeathed to the Wistar Museum. In acknowledgment of this valuable bequest, the Trustees of the University decreed that it should be named thenceforward the Wistar and Horner Museum.

The anatomical chair, under the lustre shed upon it by the professional skill and eminence of its occupants, had become notably conspicuous. They resembled each other so much in their works and ways that it seems not difficult to imagine that a kind of composite portrait of Shippen, Wistar, Physick and Horner may ever mark the Chair which they in succession so admirably filled from 1765 to 1853, about eighty-seven years, before Dr. Leidy was installed.

The University of Pennsylvania appointed Dr. Leidy its delegate to the American Medical Association in 1854 at St. Louis, Mo., and in 1872 at Philadelphia, but he did not directly contribute to its Transactions at either meeting. The Committees of the Association on Medical Literature and on Medical Science cited with encomium his papers, *On the Comparative Structure of the Liver; On the Intimate Structure and History of the Articular Cartilages; On the Intermaxillary Bone in the Embryo of the Human Subject,* published in the "American Journal of the Medical Sciences," for 1848 and 1849, and *On Parasitic Life,* printed in the Proceedings of the Academy of Natural Sciences of Philadelphia.

Dr. Leidy was on the list of permanent members of the Association from 1854 to 1876. At the St. Louis meeting he was appointed Chairman of a Committee on Diseases of Parasitic Origin, and member of a Committee on Prize Essays, but no report from either has been recorded.

In 1861 he published *An Elementary Treatise on Human Anatomy,* and in 1889, a second edition, revised and enlarged, the work having been out of print many years. The illustrations are largely from his own drawings of many recent dissections made by him in connection with this work. A peculiar feature of the volume is that English names of the parts are given in the text, and their old Latin names in footnotes, under a belief that the subject thus presented would be more readily understood by students.

Philip Leidy, the father of the professor, died October 9, 1862, in the sixty-seventh year of his age.

In 1862, when the "Satterlee," a U. S. Army Hospital, was established in West Philadelphia, Surgeon I. I. Hayes, U. S. V., in charge, a num-

ber of leading teachers and medical practitioners of Philadelphia volunteered their services as ward physicians, and received contracts as acting assistant surgeons. To Dr. Leidy was assigned the task of conducting the autopsies and reporting them, from time to time, to the Surgeon-General of the Army. A number of pathological specimens prepared by him accompanied his reports. They have been preserved in the Army Medical Museum in Washington. He made about sixty autopsies, of which his reports are published in "The Medical and Surgical History of the War of the Rebellion."* In this capacity he served from 1862 to 1865.

His brother, Dr. Philip Leidy, was assistant surgeon of the 106th Pennsylvania Infantry from November 1, 1861, till September, 1862, when he was appointed surgeon of the 119th Regiment of Infantry, and served in the field till he was honorably discharged, June 19, 1865. He was present in nearly all the battles of the Army of the Potomac, evincing courage and devotion to his duties "with the rare qualities of a gifted man." His official reports to the Surgeon-General are published in the history above named.

Dr. Joseph Leidy was appointed a member of the Sanitary Commission Association, April 3, 1862; and September 11, "The State of Pennsylvania, Executive Office of the Military Department at Harrisburg," appointed him Chief Surgeon within the old limits of the city of Philadelphia.

August, 1864, he married Anna, a daughter of Robert Harden, of Louisville, Ky. To compensate for the sterility of this union, they some years afterwards adopted the infant daughter of a deceased friend. Dr. Leidy told the writer that had this dear child been his own he could not have loved her more. He was fond of children. The crying or hilarious romping of the playmates of his young daughter in the study did not in the least degree disturb or divert him from his work.

Since his reports to the Surgeon-General of the Army the only paper connected with the science of medicine from his pen found in print is an essay on Intestinal Worms, included in *A System of Practical Medicine by American Authors*, edited by William Pepper, M.D., LL.D., etc., assisted by Louis Starr, M.D., etc., published by Lea, Brothers & Co., Philadelphia, 1888. This essay—largely derived from foreign publications—occupies thirty-five pages of the second volume. At the close of this paper, Dr.

* Vol. i, Part i, and Vol. ii, Parts i and ii.

Leidy states that for much of his information he is indebted to the articles on "Intestinal Parasites" and "Diseases from Migratory Parasites," in Ziemssen's *Encyclopædia of the Practice of Medicine.*

After he relinquished practice to devote himself exclusively to teaching, no branch of the healing art attracted or practically engaged his attention. From this circumstance his father, who unwillingly consented that he might study medicine, was probably led to say that "a first-class sign-painter had been spoiled to make a poor doctor."

Dr. Leidy delivered courses of lectures on comparative anatomy in the University, and on pure human anatomy as part of the medical curriculum, seldom adverting to its useful applications in surgery or the practice of medicine, but not merely for the sake of imparting knowledge of his subject. He carefully taught human anatomy as a means of self-maintenance. And within his domain he zealously wrought to promote the welfare of the medical department of the University, the principal source of his livelihood. This was his serious occupation, his work, which to all concerned was always acceptably done, during thirty-eight years. In all that period he was absent from his post through indisposition, at different times, in the aggregate, only five days.

His pastime, while not engaged in his appointed task, was somewhat different though not less laborious. To increase knowledge of natural things, animate or inanimate, gigantic or microscopic, seemed to be a ruling passion ; and, like a true huntsman, he cared less for the capture than for the pleasure of pursuing his game.

It may be truly said that Dr. Leidy was born to be a naturalist. To his innate ability to perceive the minutest variations in the forms and color of things was united artistic aptitude of a high order. These natural faculties, in continuous exercise almost from his infantile days, and his love of accuracy, enabled him to detect minute differences and resemblances of all objects, and to correctly describe and portray them. Besides, nothing, however small, that came within the scope of his vision, while walking or riding, escaped his notice.

He says (p. 294) of his work on *Fresh Water Rhizopods*, 1879 : "The study of natural history in the leisure of my life, since I was fourteen years of age, has been to me a constant source of happiness, and my experience of it is such that, independently of its higher merits, I warmly recommend it, than which, I believe, no other can excel it. At the same time, observing the modes of life of those around me, it has been a matter

of unceasing regret that so few, so very few people give attention to intellectual pursuits of any kind."

His first important work in natural history was begun in the winter of 1844, at the instance of Mr. Amos Binney, President of the Boston Society of Natural History. It is entitled, *Special Anatomy of the Terrestrial Gasteropoda of the United States.* By Joseph Leidy, M.D., of Philadelphia. Quarto, pp. 169; illustrated by 16 plates, containing 120 figures.

This admirable essay is included in the first of the three handsome volumes of Mr. Binney's work.* In the Preface Mr. Binney says: "The author is gratified in announcing that the anatomical details of the species, together with the dissections and drawings, are exclusively due to the labors of Joseph Leidy, M.D., of Philadelphia. They constitute the most novel and important accessions to science contained in the work, and are an honorable evidence of a skill and industry which entitle him to a high rank among philosophical zoölogists."

Dr. Leidy, in 1845, contributed three papers—anatomical descriptions of mollusks named—to the Boston Society of Natural History, which were published either in its Journal or Proceedings.

On nomination by Dr. Samuel George Morton and Messrs. John S. Phillips and John Cassin, Dr. Leidy was elected a member of the Academy of Natural Sciences of Philadelphia, July 29, 1845, then at the northwest corner of Broad and Sansom streets.

At that period natural history interested comparatively few persons in the community, and by those few was regarded chiefly as a rational pastime.

A brief retrospect of the subject, which is nearly associated with Dr. Leidy's career, may be permitted to recall its ancient standing and progress in public estimation.

John Hyacinth de Magellan, of London, in 1786, gave to the American Philosophical Society (of which he was chosen a member January, 1784) two hundred guineas, to be a permanent fund, the interest thereof to be annually awarded by the Society in premiums "to the author of the best

* *The Terrestrial Air-breathing Mollusks of the United States and the Adjacent Territories of North America;* described and illustrated. By Amos Binney. Edited by Augustus A. Gould. Charles C. Little and James Brown, Boston, 1851. Quarto, Vol. i, pp. 366, 16 plates; Vol. ii, pp. 362, 74 plates; Vol. iii, pp. 183, 57 plates.

Mr. Binney died February 18, 1847.

discovery or the most useful invention, relating to navigation, astronomy or natural philosophy (*mere natural history only excepted*)."*

This exception, though seemingly contemptuous, was wise. Had naturalists been eligible to receive those premiums, Dr. Leidy alone, who almost annually discovered many genera and species, might have earned the whole income of the fund. Magellan's opinion, which was probably common in his day, seems to have been that to discover and describe natural species of any kind is comparatively so easy, requires so little inventive aptitude and intellectual force, and the discovery itself imports so little to the good of mankind that such work needs no encouragement. A century's experience has modified this notion in many respects.

Natural history attracted very little attention in Philadelphia during the first quarter of the present century. There were some botanists, but very few were interested in other branches of natural science.

A half dozen gentlemen who, at chance meetings, often discussed questions connected with the subject, formally assembled, January, 1812, at the residence of one of them, to form a natural history society. They styled themselves "Friends of science and rational disposal of leisure moments." After due consideration at several meetings they founded, March 21, 1812, "The Academy of Natural Sciences of Philadelphia."

To rationally dispose of leisure moments; to foster peaceful study of natural things, as a wholesome diversion of the mind from the mental weariness and waste incident to idlers, quite as harmless, and more useful than contending at a game of chess; and to communicate freely to each other, as well as to the world, the results of their studies and spontaneous investigations were the chief motives which led its members to institute the Society and promote its progress.

Many books of reference, to tell students what had been already ascertained, and collections of numerous natural objects, to compare with those supposed to be new, are indispensable implements of a naturalist, but no individual was able to obtain them. Immediately after founding the

* John Hyacinth de Magellan, a Portuguese physicist, was born in Lisbon in 1723. He claimed that Magellan, the first circumnavigator, was one of his ancestral kinsmen.

He long sojourned in the convents of St. Augustin, of which he assumed the habit and removed to England about 1764, to devote himself to the study of physical science, and died at Islington, near London, January 7, 1790.

He was elected a member of the Royal Society of London, 1774, and was also a member of the Academies of Paris, Madrid and St. Petersburg. *Nouvelle Biographie general depuis les temps les plus reculés jusque nos jours. Firmin Didôt, Freres, Paris*, 1860.

Society the members saw this urgent need, and together began to form a library and a museum for their common use.

Looking forward to a time when the members of the Society would be numerous, and possibly might include zealous supporters of different religious creeds and rival political parties, the founders were somewhat apprehensive that a source of discord might arise in meetings of men holding conflicting opinions on these subjects, and for such reason agreed from the outset that, on entering the premises of the Society, every member should leave his religion and politics behind him at the door, and that debate of religious or political questions should be always out of order. This unwritten By-Law, solely designed to preserve harmony, though well understood by the members, was misconstrued outside of the Society.

Educated people, generally, then regarded the study of natural history to be in some vague way antagonistic to religion, and erroneously supposed that its votaries must be atheists or at best deists, and, therefore, to be avoided. The above unwritten By-Law, which, according to vulgar rumor, required members on joining the Society to give up religion, sustained the popular error.

During the first quarter of a century of the Academy's existence, natural history was not a part of the curriculum in any school or college in our country, because its economic value was not generally understood. Most of the Society's members were self-taught. They met in the evening once a week and before the meeting was called to order, passed some time harmoniously conversing about their studies. Their aim was to encourage spontaneous investigations and to make the Academy a practical school of natural history. No one then imagined that knowledge of it would ever become, as it is now, marketable knowledge, a part of the stock in trade of the teacher's beneficent vocation. At that time the chief incentive to the study was pure love of it, without hope of renown or emolument.

When Dr. Leidy joined the Society its library contained about 12,000 volumes, and its museum representative collections of thousands of specimens in all departments of natural history, besides chemical and other apparatus. He had at once use of all these resources, and the encouragement which flows from the fellow-feeling of many comrades working on the same line. He often said in after years that, without the facilities found in the Academy, he could not have succeeded in many of his original researches.

Dr. Leidy was elected Librarian December, 1845. He resigned at the end of the year, and the Academy voted him thanks for his efficient ser-

vice. In December, 1846, he was elected a Curator, and was continuously Chairman of the Board till he died—more than forty-four years.

During all that time he virtually directed and managed the affairs of the museum. To him it was a congenial occupation—helped him in the line of his pursuits.

At the weekly stated meetings of the Academy the Chairman of the Curators usually invited attention to any notable addition to the museum. In this connection his verbal communications, which are recorded in the Proceedings, are very numerous, and were always seemingly delivered and heard with pleasure. An examplary specimen of them is, as follows :

At a stated meeting of the Academy, October 6, 1846, Dr. Leidy announced substantially that he had lately detected an entozoon in the thigh of a hog, which "is a minute, coiled worm contained in a cyst. The cysts are numerous, white, oval in shape, of a gritty nature, and between the thirtieth and fortieth of an inch in length." He *supposed* it "to be the *Trichina spiralis* heretofore considered as peculiar to the human species. He could perceive no distinction between it and the specimens of *T. spiralis* which he had met with in several human subjects in the dissecting rooms, where it had been observed by others, since the attention of the scientific public had been directed to it by Mr. Hilton and Prof. Owen."*

In an address, delivered May 1, 1886, he said : "I recall to mind an occasion upwards of forty years ago, while I was a student assisting my preceptor, Dr. Goddard, the Demonstrator of Anatomy in the University and Prosector to Prof. Horner. We were making preparations for a lecture on the muscles when Dr. Goddard, who was endowed with quick perception and sharp vision, observed an appearance in the flesh which led him to examine it with the microscope. In it he found a number of minute coiled worms to which he called the attention of Prof. Horner. The parasite had been discovered a short time previously by the English surgeon, Sir James Paget, and was described by Prof. Owen with the name *Trichina spiralis*. Several years later I found the same parasite in pork."†

* *Proc. Acad. Nat. Sc. of Phila.*, Vol. 3, pp. 107-8, 1846.

† "An Address on Evolution and the Pathological Importance of the Lower Forms of Life." By Prof. Joseph Leidy. Delivered before the graduating class of the Medical Department of the University of Pennsylvania, May 1, 1886. Reprinted from the *Therapeutic Gazette* for June 15, 1886. George S. Davis, Detroit, Mich., 1886.

It appears that the existence of trichinæ in the human subject was first noticed in England in 1832.

On the 22d of January, 1833, Mr. John Hilton read a paper before the Medico-Chirurgical Society of London, entitled, "Notes on a peculiar appearance observed in human muscles, probably depending upon the formation of very small cysticerci. By John Hilton, Demonstrator of Anatomy at Guy's Hospital."

He states substantially that Procter, aged seventy, was admitted into the hospital for a cancer, and died three months after. "Between the [muscular] fibres, and having their long axis parallel to them, are situate several oval bodies, transparent in the middle and opaque at either end, altogether about one-twenty-fifth of an inch in length. No organization could be discovered with the aid of a microscope."*

At a meeting of the Zoölogical Society of London, February 24, 1835, Mr. Owen read a description of a microscopic *Entozoon*, infesting the muscles of the human body.†

In the *Transactions of the Zoölogical Society of London*, Vol. i, pp. 315–23, is the same paper, "By Richard Owen, Assistant Conservator of the Royal College of Surgeons in London," with a plate. In that paper Mr. Owen states in substance that Mr. Paget, an intelligent student at St. Bartholomew's Hospital, observed that muscles of the body of an Italian barometer-maker, who died January 29, 1835, aged fifty, were beset with minute whitish specs," and that Mr. Paget, aided by Mr. Brown and Mr. John Bennet, at the British Museum, at the same time satisfactorily determined the existence of the entozoon.

Mr. Wormald, Demonstrator of Anatomy at St. Bartholomew's Hospital, stated that he had noticed more than once the same condition during previous anatomical seasons, and at the request of Mr. Owen, soon furnished him ample materials for microscopic examination from the subject above mentioned. Mr. Owen at once described the entozoon, which he named *Trichina spiralis*, and reported the result of his investigation to the Zoölogical Society.

Dr. Henry J. Bowditch, of Boston, was the first American who noticed the *Trichina spiralis*.‡

No one had ever suggested a source of or how this parasite found its

* *The London Medical Gazette* for February 2, 1833, Vol. xi, p. 605.

† See Proceedings Zoöl. Soc.

‡ His observations are published in the *Boston Med. and Surg. Jour.* for 1842 and 1844.

way into the human subject until Dr. Leidy, while eating a piece of ham at his own breakfast table, discovered its existence in the hog. In announcing his discovery, with his usual caution, he said that he *supposed* it to be the *Trichina spiralis* described by Owen. This may be a reason why it was not generally recognized at the time. The publication of it in the Proceedings of the Academy was copied in full in the *Annals and Magazine of Natural History*, Vol. xix, p. 358, London, 1847; and Drs. F. Küchenmeister and F. A. Zürn state, in their work on the *Parasites of Men*, that "Leidy found, in 1847, the parasite in the muscle of pigs."*

The discovery that *Trichina spiralis* infests the hog is, in its economic relations, among the most important observations Dr. Leidy ever made.

Very soon after Dr. Leidy's discovery became generally known in Europe, the importation of American pork by Austria-Hungary, Germany, etc, was arrested, under a belief that American hogs are very often infested by this parasite. Recently, however, relying upon the system of inspection established by American authority, American pork is no longer excluded from European countries in which immense quantities of pork are consumed in the form of smoked meat, imperfectly cooked. Whether the Germans suppose, as has been asserted, that one pound of raw pork contains as much nourishment as a pound and a quarter well cooked, or prefer the taste of it simply smoked, is an open question. Be this as it may, it is now known that thorough cooking renders trichinous pork harmless.

Though the most ancient of lawgivers declared swine to be "unclean," unwholesome food, it does not seem supposable that he anticipated Leidy and knew that the pigs of his time were infested by this microscopic parasite.

Trichinæ found now in man, it is believed, are derived from the hog, but whence the hog receives the parasite has not been demonstrated.

Dr. Leidy was chosen a member of the American Philosophical Society

* Dr. T. Spencer Cobbold, a chief English authority on the subject, in his work on Entozoa, published in 1864, cites Dr. Leidy in his bibliography, but does not mention him in his text in reference to *Trichinæ*.

See, *On Poisoning by Diseased Pork*, being an essay on trichinosis or flesh-worm disease, its prevention and cure. By Julius Althaus, M.D., M.R.C.P., London, Physician to the Royal Infirmary for Diseases of the Chest, 8vo., pp. 34. John Churchill & Sons, London, 1864.

Also, *Animal Parasites and Messmates*. By P. J. Beneden, Professor at the University of Louvain; correspondent of the Institute of France, with 83 illustrations. D. Appleton & Co., New York, 1876.

October 19, 1849. Though not frequently present at its meetings, he contributed several papers to its Transactions and Proceedings.

Need of very much more space to properly accommodate the rapidly growing library and museum of the Academy had been apparent for some time, and had become so pressing that, early in 1866, measures were adopted to supply the want. Forty members were appointed a committee to solicit citizens generally to contribute to a Building Fund. Dr. Leidy was one of them, but it is believed that his modesty prevented him from actively participating in the work. A trust was created. The contributors were to elect thirteen members of the Academy Trustees of the Building Fund, with authority to purchase a site and erect thereon a suitable edifice. They represented the contributors, to whose bounty alone the Academy would be indebted for the proposed new building. When the subscriptions amounted to $100,000, the fund was placed in the custody of the Trustees.

This method of procedure was designed to remove the subject from the meetings of the Academy, and to avoid delays in construction, which, it was conjectured, might arise from officious meddling of non-contributing members, if the work were confided to a Committee of the Society.

Dr. Leidy was elected a member of the first Board of Trustees of the Building Fund, January, 1867, and was regularly reëlected till the close of his life. The work of the Board was not in harmony with his previous experience or taste. For this reason, perhaps, and because he unreservedly confided in the business ability of his colleagues rather than on his own, he did not warmly participate in it, though none was more desirous of its satisfactory achievement.

During his student days, and for years after graduation, Dr. Leidy was generally held to be poor; but he had already acquired a local reputation on account of his knowledge of natural history, and was regarded to be a young scientist of unusual promise. He attracted the attention of some prominent citizens, among them Dr. James Rush, to whose beneficence the city is indebted for the Ridgeway branch of the Philadelphia Library. Mrs. Rush was frequently pleased to make him a lion at her evening parties. At that time many persons were pleased to believe that he strongly resembled the conventional likeness of our Saviour. Both Dr. and Mrs. Rush were his friends and admirers during their lives.

Mrs. Rush died October 23, 1857. After that event Dr. Leidy often dined *tête-à-tête* with Dr. Rush.

Dr. Rush died May 26, 1869. Dr. Leidy was invited to be a pallbearer at the funeral, and at the same time received an intimation that he should not fail to be present. He accepted the invitation.

A few days afterwards he was greatly surprised by the receipt of a bank cheque for $500. He learned that Dr. Rush had named those friends whom he desired to be his pallbearers, and that he had instructed the executor of his estate to give $500 to each of those who served in that capacity at his funeral.

At its summer commencement of 1869, the Franklin and Marshall College, Lancaster, Pa., conferred upon him the honorary degree of *Legum Doctor*—LL.D.

In the spring of 1871 he was appointed Professor of Natural History in Swarthmore College, eleven miles from the city, in Delaware county, and lectured there at 10 o'clock A.M., at first once in the week and subsequently twice. He resigned the office in June, 1885, but continued his connection with the institution as emeritus or retired professor.

The Secretary of War invited him, May 6, 1873, to be the senior member of the scientific corps during an exploration of the route of the Pacific Railroad. This invitation was declined.

In December, 1874, he was offered the Hersey Professorship of Anatomy in the University of Harvard, at an annual salary of $4000.

He passed the summer of 1875 in Europe, visiting museums in London, Paris, Berlin, and mingling socially with renowned professors and distinguished votaries of natural science wherever he halted.

He spent the greater part of two seasons exploring the country around Fort Bridger, the Uinta mountains and Saltlake basin in search of materials for his treatise on *Fresh Water Rhizopods of North America*, under the auspices of the U. S. Geological and Geographical Survey of the Territories, then directed by Dr. F. V. Hayden. The work was published in 1879. Dr. Leidy states, January 1, in his introduction to it, that during four years he had studied these Rhizopods as they occur in all the fresh waters of the country from the Atlantic border to an altitude of 10,000 feet in the Rocky mountains, and gratefully refers to the generous hospitality and aid received from Dr. J. Van A. Carter, formerly of Fort Bridger, who conducted his expeditions to the Uinta mountains and defrayed their expenses. Various railroad companies granted him entirely free transportation, or at half fare, so that to the Survey the expenses of this admirable work, besides the charges incident to its publication, amounted to about $222.

His friend, Mr. Joseph Wilcox, relates that while they were visiting the "bad lands" of Wyoming, he asked Dr. Leidy, "What beauties do you see in this forbidding territory?" In reply he said, "This is a most interesting place to see, where no living animal or plant exists. I enjoy the novelty of this anomalous locality. You will all agree with the man who appropriately compared this place to the infernal regions after the fires had been put out."

During many years Dr. Leidy habitually visited the Twelfth Street Market in search of specimens, and became quite intimate with Mr. R. M. Holbrook, who is a large dealer in fresh fish, etc., and is also Treasurer of the Market Company.

Speaking of Dr. Leidy, Mr. Holbrook said, "He was a man of such simplicity of manner that he drew all classes of persons to him, even children would stop and listen to him.

"At one time a few years ago he got from me a specimen of some kind of fish and wrote an article about it, in which he gave me the credit of furnishing the specimen. The article was copied in a London journal, but by mistake gave my name as the author. As soon as he saw it Dr. Leidy came and asked me whether I had written much for the papers. He then told me of the mistake, laughed heartily, and seemed to enjoy it very much.*

"And he told me about the publication of his book on Rhizopods. And on my expressing a hope that he was well paid for his work, he said that all he got for his labor was twenty copies of it and that he was satisfied.

"At another time he told me that he had just received an unexpected remittance from Boston; that he had written a paper for the Walker prize the year before and had not received anything, but this year in consideration that his papers were good both years the committee had awarded him a double prize. His childlike manner in telling me about it, without reference to the sum of money he had received, and without the least tinge of egotism or conceit, showed that he wished me to enjoy his success with him.

"He usually came to market about six o'clock in the morning before the crowd began, and sat behind the stall a half hour or more talking and watching the men while they were cleaning fish. He was always pleased

* At a stated meeting of the Academy, May 10, 1870, Dr. Leidy "called attention to errors in published reprints of the Academy's Proceedings in foreign journals."

to carefully examine whatever might be found in the stomachs or intestines of the larger varieties. The entrails of very big ones were sometimes sent to his house that he might inspect them at his leisure. And if anything strange came along—for whatever comes into the fisherman's net is fish—it was sent to him. Sometimes he wrote the Latin name of an uncommon kind on a scrap of paper, which my men copied in large letters and, sticking it on the specimen, displayed it on the stall. For example, on one scrap he wrote, 'Horse Crevalle—Caraux hippus. Cape Cod to the West Indies. Belongs to the Pilot-fish family and related to the Mackerels;' on another, 'Pensacola black grouper—Trisopteris microlepis;' and on a third, 'The Massachusetts Tile Fish—Monacanthus Massachusettensis.'"

The Boston Society of Natural History, January 22, 1880, "Voted that the Walker Grand Honorary Prize for 1879 be awarded to Prof. Joseph Leidy for his prolonged investigations and discoveries in zoölogy and paleontology, and in consideration of their extraordinary merit the sum awarded be $1000.*

In August, 1880, an invitation to lecture and supervise the scientific studies of the postgraduates of Princeton College, N. J., was declined.

In December, 1881, he was elected without competition President of the Academy of Natural Sciences of Philadelphia, and continuously held the office till he died.

About the year 1866 it was suggested that natural history should be taught in the University. The proposition was entertained and discussed

* Dr. William J. Walker, a generous friend of science, who died at Newport, R. I., April 2, 1865, placed in trust of the Boston Society of Natural History means of awarding prizes for the best memoirs, written in English, on subjects proposed by a committee, appointed by the Council of the Society. The first and second prizes to be awarded annually, and the third once in five years, beginning 1870.

First.—For the best memoir presented a prize of $60 may be awarded, which sum, at the discretion of the Committee, may be increased to $100, if the memoir be of marked merit.

Second.—For the next best memoir a prize of not exceeding $50 may be awarded, provided it be of adequate merit in the opinion of the Committee.

Third.—Grand Honorary Prize. The Council of the Society may award the sum of $500 for such scientific investigation or discovery in natural history as may be deserving thereof in its judgment, provided such investigation or discovery shall have first been made known and published in the United States of America; and at the time of said award shall have been made known and published at least one year. "If in consequence of the extraordinary merit of such investigation or discovery, the Council of the Society should see fit, they may award therefor the sum of $1000." *Proc. Boston Soc. Nat. Hist.*, Vol. x, p. 146—1866.

from time to time, and lingered on without action. In 1882, under the propulsive and successful administration of Dr. William Pepper, the distinguished Provost of the University of Pennsylvania (whose policy apparently is to enlarge the institution and foster within it every branch of human knowledge which may be profitably taught), a school of natural history was devised and instituted under the modern style of Department of Biology, and Dr. Leidy was appointed, for the current academic year, Professor of Biology (Zoölogy) in the Faculty of Philosophy.

In 1884 the department was organized by the appointment of a Faculty of seven professors, including Dr. Leidy as Professor of Zoölogy and Comparative Anatomy, and he was elected, May 6, Director of the Biological Department.*

It was proposed, March 16, 1885, that his salary should be $6000, on condition that he should resign his position in Swarthmore College, which he did, and give his time exclusively to the University.

A laboratory, an herbarium and an appropriate museum were started. To the latter Dr. Leidy contributed many of his skillfully made preparations, and bequeathed to it an herbarium of about 1400 species of plants, collected by himself.

In this connection the University Marine Biological Association has been founded, with laboratories and aquaria located at Sea Isle City, N. J.

The Geological Society—Burlington House, London, January 5, 1884—awarded to Dr. Leidy the Lyell Medal, with its accompanying purse of £25, in recognition of his important services to paleontology.

About the close of the year 1883 the attention of Dr. Leidy was invited to a subject which he had not previously considered.

Mr. Henry Seybert, a firm believer in modern spiritualism, who died March 3, 1883, aged eighty-two years, not long before his death gave to the University of Pennsylvania a sum of money sufficient to found a Professorship of Philosophy, on condition that the University should appoint a commission to investigate "all systems of morals, religion or philosophy, which assume to represent the truth, and particularly of modern spiritualism."

Ten gentlemen, most of them members of Faculties or of the Board of Trustees of the University, were constituted a commission to investigate modern spiritualism. Dr. Leidy, with one or more members of the commission, attended twelve sittings with reputed spiritualist mediums, from

*University of Pennsylvania. Handbook of Information, concerning the School of Biology. Philadelphia, 1889.

March, 1884, to April, 1887. The commission submitted a preliminary report of its proceedings May, 1887.*

The Trustees of the Wagner Free Institute of Science elected him, July 27, 1885, President of the Faculty and Professor of Biology, at an annual salary of $500. From that date the Trustees obtained his views before deciding any question relating to the scientific policy of the Institute, and appointed members of the Faculty subject to his approval. He lectured two or three times every season, and always attracted a large audience. In the spring of 1890, lectureships superseded the Faculty system, and Dr. Leidy was elected Director of the Museum June 3, 1890, and spent some of his last days in planning a synoptical arrangement of it.

He was authorized by the Trustees to expend $3000, while in Europe in 1889, in the purchase of specimens for the museum, and on his return $1000 more were placed in his hands to be spent in the United States for objects of the same kind. His interest in the growth of the museum and library was constant. He presented many books and specimens collected by himself.

At its summer commencement of 1886, Harvard University conferred upon him its honorary degree of *Legum Doctor*—LL.D.; and the Institute of France awarded to him, December 18, 1888, the Cuvier prize medal.

He had now reached the sixty-fifth year of his age. Unremitting routine and other labors, and the enjoyment of many social meetings with friends, had somewhat abated both his physical and mental energies. Rest was desirable. Accompanied by his wife and daughter he visited Europe in the summer of 1889, but his first letters from London indicate that the sojourn there was much less cheering to him than it ever had been. And then the serious illness of Mrs. Leidy, soon after reaching England, greatly augmented his depression, although the sympathy and attention of his English friends were unstinted. After her recovery the projected tour was completed, and in September all returned in better health and spirits than when they started on their trip to Europe.

Soon after reaching home a rumor from the University was a source of much distress to Dr. Leidy. It was said that the professorships were to be rearranged, and to realize the plan he would be asked to relinquish the

* Preliminary Report of the Commission appointed by the University of Pennsylvania to Investigate Modern Spiritualism, in accordance with the Request of the late Henry Seybert. 12mo, pp. 160. J. B. Lippincott Company, Philadelphia, 1887.

Chair of Anatomy and retain his position in the Biological Department. A city newspaper reported substantially that Dr. Leidy had been requested to resign. The statement was at once authoritatively contradicted. Nevertheless, subsequently he, who was pronounced by one of the Faculty to be the "most consummate teacher that ever held the Chair of Anatomy," was requested to relinquish it, but he declined.

During the year 1890, in compliance with the wish of a valued friend, he visited several times the establishment of Mr. Keely, who claims that he had long ago discovered a new motor of extraordinary force. Diligent study during many years has failed to ascertain a practical method of applying this power to any use. With this aim Mr. Keely has constructed costly and ingenious machinery which is set in motion by this occult power. Many prominent scientists, engineers and others have been invited at different times to inspect it, hoping probably that their opinions would encourage his continuous research. It seems, however—if the public be rightly informed in the premises—that, in their judgment, the nature of this new force, whatever it may be in fact, is not yet apparent. But Dr. Leidy wrote, December 18, on his card to a friend, "Keely appeared to me to have command of some power previously unknown."

This statement is not even presumptive testimony that a previously unknown natural force is now under command. Unsurpassed ability to ascertain the structure of organisms of every kind, as Dr. Leidy had, is not in itself sufficient to guarantee that the witness may not be deceived as to the motive force that operates complicated machinery, especially one who has never been interested in or studied any branch of physics. The judgment of a backwoodsman on the sea-worthiness and fighting qualities of the first battleship he ever visited would be as respectable.

His membership in many societies at home and abroad is significant of his widespread reputation. A list of them is appended.

Prof. Henry C. Chapman, of Jefferson Medical College, in his Memoir, printed in the Proceedings of the Academy of Natural Sciences of Philadelphia, for 1891, has noticed in a summary but admirable manner each of Dr. Leidy's leading publications. Lists of all of them may be found in the Appendix.

The general character of all his works is anatomical. They consist almost entirely of technical descriptions of genera and species of existing or extinct animals. Though highly creditable to their author, they inte-

rest very few persons besides votaries of natural history, because they are not applicable to any apparent industrial use. Such writing does not bring pecuniary reward. With the exception of his books on Anatomy and reports to the Surgeon-General of the Army, he received no substantial compensation for any of his numerous essays.

Inasmuch as botany and mineralogy were greatly preferred to other branches of natural history in his early life, it is notable that he published little, if anything of importance, in connection with either.

Prof. Thomas C. Porter, of Lafayette College, among the foremost of our botanists, who was his intimate friend during many years, wrote in reply to inquiries: "To your other question I can give a definite answer. Of course, as a master of biology, he had a comprehensive knowledge of structural and physiological botany, but his interest in the plant world was only a side-interest. He had a fair acquaintance with our native flora, and his wonderful powers of observation were sometimes of great service to his friends who were engaged in its study. Had he turned his mind from animals to plants he would, no doubt, have done the same kind of valuable work amongst the latter as he had done amongst the former. But I know of no thorough investigations of the sort made or published by him. Looking over his species of Panicum one day, he remarked to me that, if he could devote the time to it, he should like to produce a monograph of that difficult genus. He had a herbarium composed chiefly of specimens of his own collection. It is not large, but like everything else which passed through his hands, in excellent condition."

In his charming personal history of Dr. Leidy, Dr. William Hunt says: "I remember walking with him along the grassy path by the seaside at Bar Harbor one summer day. We were on our way to visit a Philadelphia lady who was herself an amateur botanist, and particularly well acquainted with the region about us. Suddenly Dr. Leidy said, raising his hands, 'Dear me! there is a plant which Gray says only grows high on the mountains, and here it is by the sea.' He gathered a portion of it with great care and put it in his pocket. When he got to the house he spoke of his find, and showed Mrs. —— the specimen. 'Why, Doctor,' she said, 'that is *Empetrum.*' The doctor looked carefully at it and said, 'Why, so it is; I thought it was *Loiseleuria,*' and laughed heartily, receiving the correction as though it had come from Gray himself."*

* In Memoriam. Dr. Joseph Leidy. b. Sept. 9, 1823, d. April 30, 1891. Personal History. By William Hunt, M.D. Read at the Academy of Natural Sciences, May 12, 1891.

His deep interest in mineralogy was continuous from boyhood till the close of his life. To him it was a kind of Sunday afternoon or holiday recreation to visit friends who had cabinets, examine their newly acquired specimens, and talk about them in connection with those in rival collections. Always seeking to obtain rare specimens, especially of gems, he bought and sold and exchanged minerals with his friends whenever opportunity occurred. About the year 1870 he purchased a collection, said to be the finest ever brought from Europe to this country, and a year or two after sold it to a party in Boston for $2000, because he said he could not afford to keep it. He continually added to and improved his cabinet, which, at his death, was sold to the National Museum at Washington, D. C., for $2800.

He was not practically interested in the chemical analysis of minerals. But through his life-long habit of examining, comparing and exchanging specimens, as well as of buying and selling them, he acquired the skill of an average lapidary in recognizing mineral forms, especially of gems, and among his friends became an authority for their market value. Yet more than once he mistook an artificial for a real stone, submitted to his inspection by a dealer to test his knowledge.

Dr. Leidy had a broad chest and strong limbs, was about five feet ten or eleven inches in height and 200 pounds in weight. Relatively to his stature, slightly stooping at the shoulders, his head was rather small; and it was ascertained after death that his brain weighed forty-five and a half ounces—somewhat less than the average. But deficiency of brain tissue was probably compensated for by the sustaining power of good blood-circulating and digestive apparatus, upon the normal functions of which mental activity in a degree depends. It is commonly known that a drink of tea or of any stimulant temporarily augments the activity of the mental machinery when it is moving slowly from fatigue or other cause. It is generally supposed, however, that intellectual energy is in proportion to the size of the brain, the prevailing weight of which in adult man is from forty-six to fifty-three ounces, according to an English authority,* and from forty-five to fifty-five ounces among our own people, and among all races from two to four pounds, according to an American authority.†

**Anatomy, Descriptive and Surgical.* By Henry Gray, F.R.S.

†*An Elementary Treatise on Human Anatomy.* By Joseph Leidy, M.D., LL.D., etc. Second edition, 1889.

He says, p. 713: "All other conditions being equal, it is observed also to hold a rela-

"A little man with the same size of head as a big man will (other things being equal) possess more energy. In weight of brain, again, considerable differences exist among men of acknowledged power. The average weight of the male brain in civilized races is about 49 ounces. Cuvier's brain weighed 64 ounces; Abercrombie's and Schiller's, 63; De Morgan and Gauss, the mathematicians, 52¾ and 52 respectively. But Grote, the historian, had a brain only three-quarters of an ounce above the average, while the brains of Tiedemann, the anatomist, and Hausmann, the mineralogist, fell 5 and 6 ounces below it. * * *

"The heaviest known human brain belonged to a Sussex bricklayer, who died of consumption in University College Hospital in 1849. It exceeded 67 ounces and was well proportioned; while in physical size its owner was not greatly above the average, being 5 feet 9 inches in height and of robust frame. But the man could not read or write, though he was said to have a good memory and to be fond of politics."*

According to these data, size or weight of brain is not a measure of mental capability.

Dr. Leidy had a handsome forehead, though it was not remarkably high nor broad. Compared with the head, his face was perhaps large. Nearly horizontal, straight brows slightly overhung tranquilly pensive blue eyes, which were not widely separated by a full-sized, well-formed nose. His mouth, slightly drooping at the corners, contained a set of fine teeth. The lips were well proportioned and his chin was broad. He wore a full beard and was well crowned with fine hair. While conversing with friends the expression of his face was truly significant of his very amiable disposition. His utterance was distinct and the tone of his voice pursuasive and pleasant, though slightly nasal. A natural and very modest demeanor made him welcome wherever he was. He loved the company of his friends. No member of either the Old Contributorship, of which he was a Director, or of the Biological Club, of which he was President, enjoyed more their stated dinners; on those occasions his cheerful and instructive

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tion in size to the degree of mental development; hence the more civilized races and more cultivated and intelligent people are distinguished by a larger and heavier brain, while the opposite condition exists in the barbarous races and the least cultivated persons."

* *The Insanity of Genius and the General Inequality of the Human Faculty, Physiologically Considered.* By J. F. Nisbet, author of *Marriage and Heredity.* Ward & Downey, 12 York street, Covent Garden, London, 1891.

conversation, almost always mentioning some fact new to them, gratified his companions.*

To him controversy and conflict were always repugnant. He preferred to yield at once, rather than contend. For him it was a task to say, No. This feature of his nature at times lessened his administrative efficiency in the opinion of some of his warmest friends, and caused them on occasions to jocosely say: "Oh! he is an invertebrate."

While he was a bachelor his manner of living was properly economical, and his savings at different times amounted to considerable sums; but his financiering ability or forecast seemed to be limited to this kind of hoarding. At the time when speculation in petroleum was imagined to be a sure road to fortune, he listened to a friend supposed to be knowing in the field, invested in a petroleum company and lost $4000. On another occasion he was lured by promises to invest in a silver mine and lost about twice as much. Next he purchased stock of a certain railroad which from that day never made a dividend, and sold it for about half its cost.

During the first half of his life or more his attention was exclusively given to anatomical and natural history pursuits. General literature or popular diversions did not interest him in any considerable degree. His diary kept while in Europe in 1848 mentions that he once attended the Haymarket Theatre in London, and that he passed one evening in Paris at the Theatre du Palais Royal. But galleries of paintings and sculpture attracted his attention. To a friend who presented him a poem years ago he said: "I never read poetry. It seems to me such a round-abound way of expressing ideas." And to another he said he did not understand how anybody could read "rhyming stuff." But in the last decade of life, when age and experience had tamed his energies, and egoism was less exacting, his tastes changed. He read with pleasure certain poetic compositions, which friends commended, and now and then a novel. Theatrical amusement often attracted him, and he was sometimes pleased to hear the music of his daughter's piano in the parlor while he was engaged in his study. He daily read newspapers, and, as a good citizen, voted at elections of city, State and United States officers.

In some respects he resembled Charles Darwin. Matthew Arnold says: "Mr. Darwin once owned to a friend that, for his part, he did not experi-

*The Biological Club, as a token of its appreciation of Dr. Leidy, had painted a very satisfactory portrait of him, which is in the library of Academy of Natural Sciences.

The College of Physicians of Philadelphia has in its library a portrait, which is a lugubrious likeness, though artistically well painted.

At its Annual Commencement, May 6, 1892, the medical classes of 1892-3, presented a portrait of Dr. Leidy to the University of Pennsylvania.

ence the necessity of two things, which most men find so necessary to them—religion and poetry ; science and the domestic affections he thought were enough."*

In his autobiography Mr. Darwin says : "For many years I cannot endure to read a line of poetry; I have tried lately to read Shakespeare, and have found it so intolerably dull that it nauseated me. I have almost lost my taste for pictures and music. * * * My mind seems to have become a kind of machine for grinding general laws out of a large collection of facts."

Dr. Leidy, however, sought chiefly to ascertain facts ; he did not attempt to deduce general laws from them.

He accepted, without reserve, all the theories of evolution, etc., of Mr. Darwin, with whom he had correspondence, but their religious views were very different.

In a letter, dated February 28, 1879, addressed to his friend, the Rev. Dr. Henry C. McCook, he said : "I mark what you say in reference to quoting from the *Cosmic Philosophy* of Prof. Fiske, instead of expressing my opinions in my own language. I preferred doing so because my religious views so fully accord with those he so clearly presents to the reader. I have always had an antipathy to enter into a discussion of religious opinions, and when persons, curious to know mine, have questioned me, to avoid discussion, I have the last few years referred them to the admirable work of John Fiske.

"While I am disposed to avoid public notice, I feel some recompense in your having read my note to your audience, as it may tend to remove the reproach of atheism, which you know is so unreasonably and freely imputed to all naturalists and philosophers.

"Through life I have been conscious of having been a devoted worshiper (again to quote Mr. Fiske) 'of an ever-present God, without whom not a sparrow falls to the ground;' and I have often felt annoyed at the implied reproach of infidelity from the self-sufficient who consider that they fulfill all religious duty in lip-service to the same Deity."

Though not a regular attendant of any church, he was pleased to listen occasionally to sermons of the Rev. Drs. Phillips Brooks (Episcopalian), Ed. R. Beadle (Presbyterian) and William H. Furness (Unitarian). The teaching of the last was in accordance with his own religious views.

The genius of Dr. Leidy—an innate force that seems to dominate the

* *Discourses in America.* By Matthew Arnold. Macmillan & Co., London, 1885, p. 113.

exercise of the natural aptitudes or talents—a force none of his ancestors possessed, and is therefore not ascribable to heredity—impelled him to investigate natural objects and portray those which had not been previously described. His strong egoism was more gratified in this occupation than in any other. Some of his contemporaries, who wrought in the same field, possibly may have done more, but in the accuracy of their work none surpassed him.

Prof. Cesare Lombroso, of Turin, forcibly argues that genius of every kind is always associated with abnormal conditions of the organism, and for such reason its presence is significant of some degree or kind of degeneration.* Dr. Leidy was, as geniuses generally are said to be, precocious and sterile; also, emotional and so far, neuropathic. During his visits to Europe, too long and too eager quest of whatever he sought was sometimes followed by a feverish state and an unpleasant degree of nervous depression; but perfect rest for a day, as his diaries show, enabled him to resume his pursuits.

Dr. Leidy had a rare experience of living nearly sixty-eight years without provoking personal hostility, without making an enemy. Troops of friends encouraged his pursuits, and among them some were ever ready to give him, when needed, substantial help to publish his works. No votary of natural history was helped more or more favored or more popular.

Announcement of his death brought expressions of regret for the loss sustained and of admiration of his character from many citizens. Newspapers published sketches of his career and praised his works and ways.

The Alumni Society of the Medical Department of the University of Pennsylvania held its annual meeting in the evening of the same day. The President, Dr. Alfred Stillé, officially announced that Dr. Leidy had died in the morning, and said, among other things, that by the death of Dr. Leidy the University "looses the profoundest and most consummate teacher that ever held the Chair of Anatomy, and whose fame as a comparative anatomist, paleontologist, geologist, zoölogist and botanist was not bounded by his native city or country, but was coextensive with the civilized world.

"No man, who had such reason to be proud, was ever more humble. His simple and amiable manners attached to him the old as well as the

*_The Man of Genius._ By Cesare Lombroso, Professor of Legal Medicine at the University of Turin; with illustrations. Walter Scott, 24 Warwick Lane, London, and Charles Scribner's Sons, New York, 1891.

young, and made him revered in the gravest circles of the learned and loved by the students, whom he inspired by his example and enriched by his knowledge."

The Wagner Free Institute of Science recorded its sense of loss in a minute, as follows:

"With feelings of deep sorrow we record the death of Dr. Joseph Leidy, who, for the past six years has stood at the head of the science work of our Institute as President of the Faculty and Director of the Museum.

"The death of this true and honest man, as gentle as he was strong, as humble as he was great, is to the whole civilized world, as it is to our own country, the loss of one of the most distinguished scientists of the day; while to Philadelphia, the city of his birth and life-long home, it is the loss, not only of one of her greatest men, but as well of a true and faithful son, who loyally spent his whole life in her service, and who died, as he lived, in entire devotion to duty, wholly forgetful of himself, and mindful of the welfare of others.

"To the Wagner Free Institute of Science the loss occasioned by his death is beyond repair. The place he has left vacant cannot be filled. To him, more than any other man, and to his good guidance more than anything else, is due whatever has been accomplished by the Institute since the death of its founder, in the organization and conduct of its work in the cause of science. It is impossible to express in words the debt of gratitude we owe to him; only by deeds can we give expression to it, by striving to carry out the work which he has planned for us with such consummate skill, that it may become a living memorial of his earnest labors, his broad intelligence and his commanding knowledge."

And in the first paragraph of his Valedictory Address to the graduating classes in medicine and dentistry of the University, delivered at the annual commencement, May 1, 1891, Prof. James Tyson said: "The ink was scarcely dry on my page when came the intelligence that Joseph Leidy was seriously ill, and close on this fact of his death. This most unexpected calamity has changed the present occasion from one of rejoicing to one of mourning—scarcely mitigated by the circumstance that Dr. Leidy died as he wished, after a short illness and with his shoulder, as it were, still at the wheel. For Dr. Leidy never ceased to work. His industry was only equaled by his intellect, and these by the sweet simplicity of his life. He loved science for science's sake, and neither

poverty nor promise of riches, nor ambition, nor princely decoration could swerve him from his purpose. We are stupefied by the suddenness of our loss. And there is a fitness in the association of the end of your greatest teacher's life, and the new commencement of your own, which ought not to be without its effect in keeping green his precious memory, and in stimulating you to emulate his example."

The funeral services were at the First Unitarian Church, May 2. Members of the societies to which he belonged, the Faculties of the University, and prominent citizens in large numbers were present. The venerable and Rev. Dr. Furness officiated, and delivered an eloquent and touching tribute to his worth.

His remains, and at the same time those of his brother, Dr. Philip Leidy, who died April 29, were cremated, May 9.

Not long afterwards representatives of the University solicited contributions to an endowment of $50,000 to be raised at once and exclusively devoted to the use of his widow; and ultimately revert to the University, "to establish and endow the *Leidy Memorial Museum* as an independent part of the great museum" projected for the Institution. Dr. Leidy bequeathed a modest sufficiency for his family. For such reason, probably, the necessity of the proposed endowment was not generally regarded to be urgent. About the same time it was decided to obtain an endowment for the Chair of Anatomy, the sum to be counted in the General Endowment Fund of $250,000 for the Medical Department, which, to make Dr. Pepper's conditional subscription of $50,000 payable, "must be secured before June 1, 1892," and then designate this chair by "the illustrious name of Leidy, whose labors gave it imperishable fame." "No more fitting memorial," says the circular, "can be found for this great man and beloved teacher." And the other circular says, "No memorial of Joseph Leidy can be more fitting than a museum in which will be garnered the infinite variety of natural objects which formed the basis of his admirable studies."

Prof. J. P. Lesley, his personal and scientific friend, early in May published in the *Christian Register* a warm tribute to his worth and memory. He said among other statements: "The eulogy of the dead runs easily into exaggeration. In this case that cannot happen. Rare men are so rare—a few in a generation, here and there one whose excellence is above degrees, the perfect man, the ideal man. He is like a statue set up in the public park of the metropolis, veiled until the day of showing

comes. Death drops the veil, and the splendid apparition smites the heart of the community with a strange astonishment."

He also said, in substance, that while Cope and Marsh were working the fossiliferous field into which Dr. Leidy had entered long before, and by his labor made, in a sense, his own, they fell into disputes over priority of dates of different names of genera and species found in the later strata of a Western Territory, in which contention Leidy, the friend of both, refused to take any part. And, it seems proper to add, so dominant was his repugnance to controversy of every kind that he left his friends, freed from his participation, to compete with each other, and for a considerable period engaged in an entirely different field of investigation, to return not very long afterwards to his beloved paleontology.

The Trustees of the Building Fund of the Academy of Natural Sciences ordered, May 15, 1891, a memorial notice to be preserved with the record of their proceedings, in which it is stated that "his modest, amiable deportment at all times, his abiding interest in the welfare of the Academy and in the progress of the natural sciences, won for him the unreserved confidence and respect of his colleagues on the Board, and made his presence at its meetings always welcome. But his connection with the Trustees and his many official positions in the Academy could not add to the high estimation in which he was held in the community. His accurate and extensive knowledge of natural history in all its departments, his writings, his most acceptable teachings as Professor of Natural History in Swarthmore College, and as Professor of Human Anatomy in the University of Pennsylvania during more than a third of a century, from May, 1853, obtained for him a deserved reputation and fame among the friends of the Natural Sciences at home and abroad."

In his *Address to the Graduating Class of 1891, at Swarthmore College,* June 16, the President of the Board of Managers, Mr. Joseph Wharton, said: "And since nothing more potently aids us in the struggle to become wiser and better than observation of those who stand above us, and study of their methods, I can do nothing more fitting this occasion than endeavor to show you how this great man came to be so eminent, so trusted and so beloved.

"Joseph Leidy inherited excellent constitution of mind and body; he was transparently sincere and absolutely devoted to truth; he was remarkably devoid of selfishness in any form; he had persistent and life-long diligence; he was systematic in his expenditure and careful in his

economy of time; he held firmly to whatever task he undertook; his temper was cheerfully equable and his disposition affectionate."

Commenting on each of these characteristics successively, in a lucid style, Mr. Wharton thus happily concludes his pleasing address: "If now I have succeeded in showing you that every part of Dr. Leidy's great eminence grew out of the cultivation of such natural powers as your own, and out of the constant practice of such simple virtues as should also be yours, that, in a word, you may hope to scale such heights, to breathe such lofty air, to serve so well your kind, and to attain such universal respect and affection, without possessing other genius than that which has been defined as 'an infinite capacity for taking pains;' and if in showing this I have stirred in you a secret resolution to make your lives bear some resemblance to his clean and fruitful life, my aim has been reached."

The tribute delivered at the opening session of the Congress of American Physicians, assembled at Washington, D. C., September 21, 1891, is the last. Dr. Pepper, the distinguished Provost of the University of Pennsylvania, said: "In the death of Joseph Leidy, which occurred April 30, 1891, at the age of sixty-eight years, the medical profession in America lost its most loved and honored member, and American science its most illustrious representative.* It makes a difference to the world when such a man passes away. At his birth Nature gave him her accolade, and all his life long he was loyal to the holy quest of truth, which is the vow imposed on those whom she invests as her chosen knights. Who can say how much of the marvelous and inexhaustible knowledge of nature this great man possessed came from the singleness of his life and the purity of his heart," etc., etc.

Leidy's life sustains rather Arthur Schopenhaur's opinion, that "thinkers and men of genius are those who have gone straight to the book of Nature; it is they who have enlightened the world and carried humanity further on its way."†

* Knowing that Dr. Leidy had entirely ceased to practice medicine more than forty years before, a witty friend of the Provost, after reading his graceful eulogy, remarked in substance that it was like telling an assembly, representative of all the tanners of the United States that, in the death of General Grant, they had lost the most beloved member of the trade.

† November 17, 1891, Dr. William Hunt delivered an address on his University career before the alumni and students of the Medical Department of the University of Pennsylvania.

Postscript.—In the preparation of the preceding sketch, the writer has earnestly endeavored to avoid errors and hopes that he may have fairly succeeded. Mindful that death at once hides the blemishes of a man from the eyes of those who loved him while living, and at the same time magnifies his virtues, the aim has been to present an accurate outline of his character. Incidents connected with the career of Dr. Leidy, though some of them may be unimportant or even trivial, have been narrated under an impression that they may assist in conveying a true representation of him.

The degree of usefulness to the world of his life-long work, according to the opinion that may be formed of it in the future, will be the criterion of its worth as well as the measure of the duration of his reputation.

APPENDIX.

Societies at Home and Abroad of which Dr. Joseph Leidy was a Member.

Boston Society of Natural History, 1845.
Academy of Natural Sciences of Philadelphia, July 29, 1845.
Naturhistorischer Verein für das Grossherzogthum Hesse und Umgebung, 1848.
American Academy of Arts and Sciences, 1849.
American Philosophical Society, Oct., 1849.
Fellow of the College of Physicians of Philadelphia, 1851.
Philadelphia County Medical Society.
Société de Biologie, Paris, 1851.
Medical Society of Virginia, 1852.
Linnean Society of Pennsylvania College, Gettysburg, 1853.
Société Imperiale de Naturalistes de Moscow, 1853.
Logan Institute, Virginia, 1853.
Zoösophical Society of the University of Pennsylvania, 1853.
Philomathian Society of the University of Pennsylvania, 1854.
Société des Sciénces des Arts et des Lettres de Hainault, 1853.
Dallas Historical Society, 1855.
Iowa Lyceum, Des Moines, 1855.
Natural History Society of Charleston, S. C., 1855.
American Medical Association, 1856.
Academy of Sciences, St. Louis, Mo., 1856.
K. Leopoldinisch Carolinische Deutsche Akademie der Naturforscher, 1857.
Zoölogical Society of London, 1857.
K. Bairische Akademie der Wissenschaften, 1858.
Dublin University Zoölogical and Botanical Association, 1859.
Burlington County [N. J.] Lyceum of History and Natural Science, 1859.
K. Bömische Gesellschaft der Wissenschaften, 1860.
R. Academia economicoagraria dei Georafili di Firenze, 1861.
K. K. Zoologisch-botanischer Verein, Wien, 1861.
Geological Society of London, 1861.
Dublin Natural History Society, 1863.
National Academy of Sciences [an original member], 1863.
Minnesota Historical Society, 1863.
Entomological Society of Pennsylvania, 1864.
College of Physicians and Surgeons, Reading, 1870.
Alumni Society of the Medical Department of the University of Pennsylvania, 1871.
Anthropological Society of London, 1872.
Linnean Society of London, 1872.
Minnesota Academy of Natural Science, 1873.
Société Nationale des Sciénces Naturelles de Strasbourg, 1873.
Sociedad Mexicana de Historia Natural, 1874.

Zoölogical Society of Philadelphia, 1876.
Literary and Philosophical Society of Liverpool, 1877.
Historical Society of Pennsylvania, 1884.
Biological Society of Washington, D. C., 1884.
New York Microscopical Society, 1884.
K. Danske Videnskabernes Selskab, 1886.
Essex Institute, 1887.
Victoria Institute, or Philosophical Society of Great Britain, 1888
Anthropometric Society, P.
Association of American Anatomists, P.
In all 50.

Dr. Leidy's Medical Papers and Books.

The Medical Journal of the Medical Sciences:

On Several Important Points in the Anatomy of the Human Larynx. Vol. 12, pp. 141–43, 1846.

Researches into the Comparative Structure of the Liver. Vol. 15, pp. 13–25, 3 plates, Jan., 1848.

On the Intimate Structure and History of the Articular Cartilages. Vol. 17, pp. 277–94, 2 plates, April, 1849.

Intermaxillary Bone in the Embryo of the Human Subject. Vol. 17, p. 577, 1849. Also reported Jan. 9, 1849, in Proc. Acad. Nat. Sci., Vol. 4, pp. 145–47.

Notice of Certain Bodies observed in the Human Subject. Vol. 20, pp. 89–91, 1850.

Human Anatomy. By James Quain, M.D. Edited by Richard Quain, F.R.S., and William Sharpey, M.D., F.R.S., Professor of Anatomy and Physiology in University College, London. First American from the Fifth London Edition. Edited by Joseph Leidy, M.D. In 2 Vols., with over 500 illustrations. Lea & Blanchard, Philadelphia, 1849.

Atlas of Pathological Histology. By Gottlieb Gluge, Professor of Physiology and Pathological Anatomy in the University of Bruxelles; Member of the Royal Academy of Bruxelles. Translated from the German by Joseph Leidy, M.D., Pathologist to St. Joseph's Hospital, Philadelphia; Fellow of the College of Physicians of Philadelphia; Honorary Fellow of the Medical Society of Virginia; Corresponding Member of the Biological Society of Paris, etc. With 320 figures, plain and colored, on 12 copperplate engravings. Folio, pp. 100. Blanchard & Lea, Philadelphia, 1853.

The Medical and Surgical History of the War of the Rebellion. Quarto. Part i, Vol. 2, 1870. *Surgical History:*

Report of Case of Gunshot Wound of the Cervical Vertebræ, with Autopsy and Specimen. p. 431, 1863.

Gunshot Wound of Rib, with Autopsy and Specimen. p. 569.

Part ii, Vol. 2, 1876. *Surgical History:*

Gunshot Flesh Wound, with Autopsy. p. 439.

Excision of Humerus necrosed after Gunshot Wound, with Autopsy. p. 596.

Gunshot Wound of Forearm, with Autopsy and Specimen. p. 927.

Specimen of Ulna successfully excised on Account of Gunshot Wound, with Report of the Case. p. 962.

Part ii, Vol. 1, 1879. *Medical History:*

Reports of Cases and Autopsies made from July 30, 1862, to Oct. 25, 1864. pp. 109–122; and subsequently p. 300, p. 518 and p. 581.

NOTE.—Dr. J. Leidy's official communications to Surgeon-General Barnes embrace reports of more than sixty autopsies and cases.

An Elementary Treatise on Human Anatomy. By Joseph Leidy, M.D., Professor of Anatomy in the University of Pennsylvania; Curator of the Academy of Natural Sciences; Member of the American Philosophical Society, American Academy of Arts and Sciences, Natural History Society, Boston, Lyceum of Natural History, New York, Elliot Natural History Society, Charleston, S. C., Medical Society of Virginia, Academy of Sciences of St. Louis, Imperial Society of Moscow, Royal Academy of Sciences, Munich, Imperial Leopold Carol. Academy of Sciences of Jena, Biological Society of Paris, Society of Arts and Sciences, Mons, Zoölogical Society, London, United Zoölogical and Botanical Association, Berlin, etc. With 392 illustrations. J. B. Lippincott & Co., Philadelphia, 1861.

Intestinal Worms. 8vo, pp. 930–964 incl., in Vol. 2 of A System of Practical Medicine. By American Authors. Edited by William Pepper, M.D., LL.D., etc.; assisted by Louis Starr, M.D., etc. Lea, Brothers & Co., Philadelphia, 1888.

An Elementary Treatise on Human Anatomy. By Joseph Leidy, M.D., LL.D., Professor of Human and Comparative Anatomy and Zoölogy in the University of Pennsylvania; President of the Academy of Natural Sciences, and of the Faculty of the Wagner Free Institute of Science. Second Edition, rewritten, with 495 illustrations. 8vo, pp. 950. J. B.Lippincott Company, Philadelphia, 1889.

DR. LEIDY'S BOOKS AND PAPERS ON NATURAL HISTORY.

Anatomical Description of the Animal of Littorina angulifera. Illustrated. [Presented July 16, 1845.] Boston Journal of Natural History, Vol. 5, pp. 314–17. Boston, 1847.

On the Anatomy of the Animal of Helix albolabris, Say. Illustrated. Proceedings of the Boston Soc. Nat. Hist., Vol. 2, p. 57, 1845.

On the Sack of the Dart, and of the Dart in Several Species of American Pneumobranchiate Mollusks. Proc. Boston Soc. Nat. Hist., Vol. 2, pp. 59–60, 1845.

A Notice of Helix lithophaga, p. 207, Official Report of the United States Expedition to Explore the Dead Sea and River Jordan. By Lieut. W. F. Lynch, U.S.N. Published at the National Observatory, Washington. Quarto, printed in Baltimore, 1852.

DR. LEIDY'S PAPERS PUBLISHED IN THE PROCEEDINGS OF THE AMER. PHILOS. SOC.

Octavo.

Verbal Remarks, March 4, 1859, on the Geology of the Headwaters of the Missouri. Vol. 7, p. 10.

A Biographical Notice of Isaac Lea, LL.D. Read Nov. 18, 1887. Vol. 14, pp. 400–3.

DR. LEIDY'S PAPERS PUBLISHED IN THE TRANSACTIONS OF THE AMER. PHILOS. SOC.

Vol. 10, New Series, Quarto, Published 1853:

On the Organization of the Genus Gregarina of Dufour. Read Jan. 3, 1851, pp. 233-40, 2 plates.

Some Observations on Nematoidea imperfecta, and Description of Three Parasitic Infusoria. pp. 241-44, 1 plate.

Description of an Extinct Species of American Lion. Read May 7, 1852, pp. 319-24, 1 plate.

A Memoir on the Extinct Dicotylina of North America. Read May 21, 1852, pp. 323-43, 4 plates.

In Vol. 11, New Series, Quarto, 1860:

Notice of the Remains of the Walrus discovered on the Coast of the United States. pp. 83-86.

Descriptions of the Remains of Fishes from the Carboniferous Limestone of Illinois and Missouri. Read July 15, 1856, pp. 87-90.

Saurocephalus and its Allies. Read Nov. 21, 1856, pp. 90-95.

Observations on the Extinct Peccary of North America; being a Sequel to a Memoir on the Extinct Dicotylinæ of America. Read Nov. 21, 1856, pp. 96-105.

Extinct Vertebrata from Judith River and Great Lignite Formations of Nebraska. pp. 139-54, plate.

UNITED STATES GEOLOGICAL SURVEY OF THE TERRITORIES.

Description of the Remains of Extinct Mammalia and Chelonia from Nebraska Territory, collected during the Geological Survey under the Direction of Dr. David Dale Owen. By Joseph Leidy, M.D., of Philadelphia. Quarto. Pp. 540-72 of the Report of the Geological Survey of Wisconsin, Iowa and Minnesota. By D. D. Owen, under instructions of the U. S. Treasury Department. Lippincott, Grambo & Co., Philadelphia, 1852.

Contributions to the Extinct Vertebrate Fauna of the Western Territories. By Prof. Joseph Leidy. Quarto, pp. 358, 37 plates. Being Vol. 1 of the Report of the United States Geological Survey of the Territories. By F. V. Hayden, United States Geologist in Charge. In Five Volumes. Government Printing Press, Washington, 1873.

Freshwater Rhizopods of North America. By Joseph Leidy, M.D., Professor of Anatomy in the University of Pennsylvania, and of Natural History in Swarthmore College, Pennsylvania. Government Printing Office, Washington, 1879. Quarto, pp. 324+48 =372. Illustrated by six figures intercalated in the text, and 48 plates which contain 1180 figures of 31 genera and 84 species, of which Dr. Leidy originally described 52 species. All the figures were first drawn and colored by Dr. Leidy, to be copied by artists.

JOURNAL OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.
Second Series. Quarto.

1. History and Anatomy of the Hemipterous Genus Belostoma. 2. Miscellanea Zoölogica. Vol. 1, pp. 57-67 and 67-70, 1 plate, 1847.

Descriptions of two species of Distoma, with the partial history of one of them. Vol. 1, pp. 301-309, 1 plate, 1850.

Descriptions of Some American Annelida abranchia. Vol. 2, pp. 43–50, 1 plate, 1850.

Description of a New Species of Crocodile from the Miocene of Virginia. Vol. 2, pp. 135–8, 1 plate, printed Dec. 1851.

On the Osteology of the Head of Hippopotamus, and a Description of the Osteological Characters of a New Genus of Hippopotamidæ. Vol. 2, pp. 207–24, 1 plate, 1853.

On Bathygnathus borealis, an Extinct Saurian of the New Red Sandstone of Prince Edward's Island. Vol. 2, pp. 327–30, 1 plate, 1854.

Contributions towards a Knowledge of the Marine Invertebrate Fauna of the Coasts of Rhode Island and New Jersey. Vol. 3, pp. 135–152, 2 plates, 1855.

Descriptions of Some Remains of Fishes from the Carboniferous and Devonian Formations of the United States. Vol. 3, pp. 159–65, 1 plate, 1856.

Descriptions of Some Extinct Mammalia. Vol. 3, pp. 166–71, 2 plates, 1856.

The Extinct Mammalian Fauna of Dakota and Nebraska. Including an Account of Some Allied Forms from Other Localities, together with a Synopsis of the Mammalian Remains of North America. Illustrated with 30 plates. Preceded with an Introduction on the Geology of the Tertiary Formations of Dakota and Nebraska, accompanied with a Map. By F. V. Hayden, M.D., Professor of Mineralogy and Geology in the Univ. of Pa., U. S. Geologist, etc., etc. Vol. 7, pp. 472, 1869.

Note.—The authors of the above-named work were enabled to execute it chiefly through the generosity of Messrs. Joseph Jeanes and William P. Wilstach, to whom, as well as to some others, they acknowledge indebtedness.

Description of Vertebrate Remains chiefly from the Phosphate Beds of South Carolina. Vol. 8, pp. 209–61, 5 plates, 1874–81.

Parasites of the Termites. Vol. 8, pp. 425–47, 2 plates, 1874–81.

Remarks on Bathygnathus borealis. Vol. 8, pp. 449–51.

Urnatella gracilis, a Fresh-water Polyzoan. Vol. 9, pp. 5–16, 1 plate, 1884.

Smithsonian Contributions to Knowledge.

Quarto.

A Flora and Fauna within Living Animals. (Accepted for publication 1851.) Vol. 5, pp. 68, 10 plates, 1853.

Memoir on the Extinct Species of Fossil Ox. (Accepted for publication 1852.) Vol. 5, pp. 20, 5 plates, 1853.

The Ancient Fauna of Nebraska; or a Description of Extinct Mammalia and Chelonia from the Mauvaises terres of Nebraska. (Accepted for publication 1852.) Vol. 6, pp. 126, 25 plates, 1854.

A Memoir on the Extinct Sloth Tribe of North America. (Accepted for publication Dec., 1853; published June, 1855.) Vol. 7, 1855, pp. 70, 16 plates.

Cretaceous Reptiles of the United States. (Accepted for publication Dec., 1864.) Vol. 14, 1865, pp. 140, 20 plates.

Annual Reports of the Board of Regents of the Smithsonian Institution.

Brief Review of a Memoir on the Cretaceous Reptiles of the United States, published in the Fourteenth Volume of the Smithsonian Contributions to Knowledge. By the Author, Joseph Leidy, M.D. 8vo, pp. 66–73. For the year 1864. Washington, D. C., 1865.

WRITTEN AND VERBAL COMMUNICATIONS BY DR. JOSEPH LEIDY PUBLISHED IN THE PROCEEDINGS OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

1845.

Notes taken on a Visit to White Pond, Warren Co., N. J., and a List of Ten Species of Fossil Shells collected there. Vol. 2, p. 279.

Verbal, Nov. 18, That his microscopic observation of a portion of a vertebra of the Fossil Zeuglodon shows that it has all the characteristics of recent bone. Vol. 2, p. 292.

1846.

Remarks on the Anatomy of the Abdominal Viscera of the Sloth, Bradypus tridactylis. Vol. 3, pp. 72–4, 2 figures.

On the Anatomy of Spectrum femoratum, Say. Vol. 3, pp. 80–4. Illustrated by 18 figures on 2 plates.

On the mechanism which closes the membranous wings of the genus Locusta. Vol. 3, p. 104, 1 fig.

Descriptions of a new genus and species of Entozoön, Cryptobia helicis. Vol. 3, p. 100, 1 fig. [Finding that this name, Cryptobia, had been previously appropriated he changed it, August, 1847, to Cryptoicus.]

Verbal, Oct. 6, notice that he had lately detected an Entozoön [*Trichina spiralis*] in the superficial part of the extensor muscle of the thigh of a hog. Vol. 3, pp. 107–8.

On the Situation of the Olfactory Sense in the Terrestrial Tribe of Gasteropodous Mollusca. Vol. 3, pp. 136–7.

Verbal, April 15, remarks on the great fecundity of the Cryptogamia indicated in a specimen Puffball. Vol. 3, p. 195.

1847.

Verbal, May 4, statement that he has observed numerous octagonal crystals, supposed to be oxalate of lime, in the cellular structure of several species of Parmelia. Vol. 3, p. 210.

Verbal, June 8, notice of the remains of sutures of the incisive bone distinctly traceable in the cranium of a New Hollander, then exhibited. Vol. 3, p. 217.

Verbal, June 22, description of Distoma helicis, an Entozoön found in the pericardium of Helix alternata. Vol. 3, p. 220.

Verbal, Aug. 24, remarks on the teeth of the specimen of Squatina Dumerli exhibited. Vol. 3, p. 247.

Description and Anatomy of a New and Curious Subgenus Planaria. Vol. 3, pp. 248–51.

Description of two new species of Planaria. Vol. 3, pp. 251–2.

On the Fossil Horse of America. Vol. 3, p. 262, 1 plate, 6 figs.

Verbal, Nov. 9, remarks on the slow destructibility of Animal Tissues in certain states. Vol. 3, p. 313.

On a new genus and species of Ruminantia, Poebrotherium Wilsonii. Vol. 3, pp. 322–6, 1 plate, 6 figs.

Verbal, Dec. 14, observations, in addition, on the Fossil Horse. Vol. 3, p. 328.

1848.

Verbal, Jan. 11, notice that he had found an eye in Balanus rugosus, heretofore admitted to exist only in the larva or imperfect stage of the Cirrhopoda. Vol. 4, p. 1.

Verbal, Feb. 15, notice of the hair of a Hottentot boy. Vol. 4, p. 7.

On some peculiar bodies in the Boa constrictor, resembling Pacinian bodies. Vol. 4, pp. 27–8, 4 figs.

A new fossil genus and species of ruminatoid pachydermata, Merycoidodon Culbertsonii. Vol. 4, pp. 47–50, 5 figs.

Verbal, Dec. 5, remarks on the development of the Purkenjeau corpuscle in bone; the intimate structure of cartilage, and on the arrangement of the areolar sheath of muscular fasciculi and its relations to the tendon. Vol. 4, pp. 116–20.

1849.

Verbal, Jan. 9, remarks on the existence of the intermaxillary bone in the embryo of the human subject. Vol. 4, pp. 145–7, 2 figs.

Remarks on fragments of the fossil Tapir deposited in the Academy. Vol. 4, pp. 180–2.

Remarks on species of Confervaceæ; on a new genus of Enterobrus elegans; Cladophytum; a new genus of Entophyta; Cladophytum somatum; Anthromitus (a second new genus); new Genera of Entozoa. Vol. 4, pp. 225–33.

On the Existence of Entophyta in healthy animals, as a natural condition. Vol. 4, pp. 225–33.

Observations on the Character and Intimate Structure of the odoriferous glands of the Invertebrata. Vol. 4, p. 234–6, 3 figs.

New genus and species of Entophyta. Vol. 4, pp. 249–50.

1850.

Remarks on Entophyta. Vol. 5, pp. 7–8.

Verbal, April 9, that he had observed in the stomach of the larva of Arctia isabella that the nucleus of every epithelial cell contained an octahedral crystal, the axis of which measured about 1.3750th of an inch, etc., etc. Vol. 5, p. 32.

On Crystalline Bodies in the tissues of plants. Vol. 5, pp. 32–3.

On Rhinoceros occidentalis. Vol. 5, p. 119.

Descriptions of new Entophyta growing within Animals. Vol. 5, p. 35.

Eucrotaphus Jacksoni, and Archæotherium Mortoni, from fragments of crania found in Cumberland Co., Pa. Vol. 5, pp. 92–3.

Contributions to Helminthology. Vol. 5, pp. 96–8.

Notes on the Development of the Gordius aquaticus. Vol. 5, pp. 98–100.

Two new species of Infusorial Entozoa. Vol. 5, p. 100.

Descriptions of some Nematoid Entozoa infesting Insects. Vol. 5, pp. 190–202.

Descriptions of three Filaria. Vol. 5, pp. 117–8.

Remarks on the nettling organs of the Hydra. Vol. 5, pp. 119–121.

On some fossil mammalian remains: Rhinoceros Nebraskensis; Palæotherium Bairdii; Merycoidodon Culbertsonii and Agriochœrus antiquus. Vol. 5, pp. 121–2.

Descriptions of new genera of Vermes. Vol. 5, pp. 124–6.

1851.

Descriptions of new species of Entozoa. Vol. 5, p. 155.

On some fragments of Palæotherium Proutii. Vol. 5, pp. 170–1.

Fossil Tortoise, Stylemys Nebrascensis. Vol. 5, p. 172.

Testudo lata—Emys hemispherica. Vol. 5, p. 173.

On the fungus disease of Cicada septemdecem. Vol. 5, p. 235.

Verbal, May 6, on transplanting cancer. Vol. 5, p. 201.

Verbal, May 16, that he had found a dead Mole Cricket (Grillo talpa Americana), perfect in all its parts, the body of which was everywhere filled with a parasitic fungus, the elliptical or globular sporules of which averaged 1.2333d of an inch in diameter. Vol. 5, p. 204.

Contributions to Helminthology. Vol. 5, pp. 205–9.

Helminthological Contributions, No. 2. Vol. 5, pp. 224–7.

Remarks on Fragments of fossil ruminant ungulates. Vol. 5, p. 237–9.

Helminthological Contributions, No. 3. Vol. 5, p. 239–44.

Plumatella diffusa, a branching fresh-water ciliated Polyp. Vol. 5, pp. 261–2.

Description of Cristatella magnifica. Vol. 5, p. 265.

Description of Spongilla fragilis. Vol. 5, p. 278.

Corrections and additions to former papers on Helminthology. Vol. 5, pp. 284–90.

Verbal, Nov. 4, that he had examined the fossil saurian bones presented by Mr. Nash, and found that they belong to a new species of Crocodile which he had named Crocodilus antiquus. Vol. 5, p 307.

Descriptions of Balæna palæatlantica and Balæna prisca, Leidy, based on fragments of fossil bones from the Miocene formation of Virginia. Vol. 5, pp. 308–9.

On some American fresh-water Polyzoa. Vol. 5, pp. 320–2, 1 plate with 5 figs.

Verbal, on fossil reptilian and mammalian remains found in the green sand of New Jersey: Cimoliasaurus maguus; Discosaurus vetustus; Priscodelphinus Harlani; Priscodelphinus grandævus; Crocodilus fastigiatus; Emys Oweni, all Leidy. Vol. 5, p. 325–8.

Fossils from the Green Sand of New Jersey, named Chelonia grandæva; Trionyx priscus; Machairodus primævus, Leidy. Vol. 5, pp. 329–30.

Contributions to Helminthology. Vol. 5, pp. 349–51.

1852.

Verbal, Jan. 6, remarks on Rhinoceros Americanus, named from fragments of fossil bones collected in Nebraska. Vol. 6, p. 2.

Verbal, Jan. 13, that the Cetacean remains, which he had named Priscodelphinus, are the first relics of mammals found in the Cretaceous group. Vol. 6, p. 3.

Verbal, Feb. 10, on Emys Culbertsonii, a new species. Vol. 6, p. 34.

Verbal, Feb. 17, on Delphinus Conradi, and a new genus and species, Thoracosaurus grandinis. Vol. 6, p. 35.

Verbal, March 2, on Pontogeneus priscus. Vol. 6, p. 52.

Verbal, March 16, Pointing out that heads of the Hippopotamus from N. W. Africa differ from those from Southern Africa. Vol. 6, p. 53.

Verbal, March 28, on a fine skeleton of Troglodytes Gorilla, presented by Dr. Henry A. Ford of Liberia. Vol 6, p. 53.

On Fossil Tortoises from Nebraska. Vol. 6, p. 59.

Verbal, May 4, notice of an extinct species of Ox, and Bootherium. Vol. 6, p. 71.

On the Red Snow of the Arctic Regions. Vol. 6, p. 59.

On the Honey Ant of Mexico. Vol. 6, p. 72.

Remarks on various fossil teeth. Vol. 6, p. 241.

On some fossil fragments from Natches. Vol. 6, p. 303.

Verbal, July 6, remarks on Bison latifrons (Leidy) and B. antiquus Leidy ; and on several species of Megalonyx (3 Leidy). Vol. 6, p. 117.

1853.

Verbal, March 8, notice of three species of fossil Ursus. Vol. 6, p. 303.

Verbal, Aug. 2, remarks on Cetacean fossil bones in the green sand of N. J. : and on Cetacean fossils from other localities. Vol. 6, p. 377.

Verbal, Nov. 1, notice of fishes being infested with a parasitic worm of the genus Distoma. Vol. 6, p. 433.

Remarks on a collection of fossil mammalia and chelonia from the Mauvaises Terres of Nebraska. Vol. 6, pp. 392–4.

1854.

Verbal, May 23, account of fossil vertebræ of extinct saurians, which he named Breinosaurus grandis and Cimoliasaurus magnus, illustrated by 6 figs. on a plate. Vol. 7, p. 72.

Verbal, June 6, on Bison latifrons, Arctodus pristinus, Hippodon speciosus and Merycodus necatus. Vol. 7, pp. 89–90.

Synopsis of Extinct Mammalia from Nebraska. Vol. 7, pp. 156–7.

On Denictis felina. Vol. 7, p. 127.

On Hydrachma. Vol. 7, p. 202.

Description of a fossil apparently indicating an extinct Species of the Camel Tribe. Vol. 7, pp. 172–3.

On Urnatella gracilis and a new species of Plumatella. Vol. 7, pp. 191–2.

Notice of some Fossil Bones Discovered by Mr. Francis A. Lincke in the Banks of the Ohio River. Vol. 7, pp. 199–201.

Remarks on the question of the identity of Bootherium cavifrons with Ovibos moschatus, or O. maximus. Vol. 7, pp. 209–10.

1855.

On a so-called Fossil Man. Vol. 7, p. 34.

Indications of twelve species of Fossil Fishes. Vol. 7, pp. 395–7.

Indications of five species with two new genera of Extinct Fishes. Vol. 7, p. 414.

Notices of some Tape Worms. Vol. 7, pp. 443–4.

1856.

Verbal, Jan. 15, on Filaria canis cordis filling the right auricle and right ventricle of the heart of a dog, which was exhibited. Vol. 8, p. 2.

Description of two Ichthyodorulites. Vol. 8, pp. 11–2.

Synopsis of Entozoa and some of their Ecto-congeners, observed by the Author. Vol. 8, pp. 42–58.

Notices of some remains of extinct Mammalia recently discovered by Dr. F. V. Hayden in the Bad Lands of Nebraska. Vol. 8, p. 59.

Notices of extinct Reptiles and Fishes, discovered by Dr. F. V. Hayden in the Bad Lands of Judith River, Nebraska Territory. Vol. 8, pp. 72–6.

Notices of remains of extinct Mammalia, discovered by Dr. F. V. Hayden in Nebraska Territory. Vol. 8, pp. 90–1.

Notice of the remains of a species of Seal from the postpliocene deposit of the Ottowa River. Vol. 8, pp. 90–1, with a plate.

Notices of several genera of extinct Mammalia previously less perfectly characterized. Vol. 8, pp. 91–2.

Verbal, Sept. 16, in reference to the color of the eyes of Platyphyllum concerum (Katydid) being greenish by day and cherry red at night. Vol. 8, p. 162.

Verbal, Sept. 16, that oyster and clam shells are perforated by a sponge of the genus Cliona. Vol. 8, p. 162–3.

Notice of some remains of extinct vertebrated animals. Vol. 8, pp. 163–5.

Notices of remains of extinct vertebrated animals of New Jersey, collected by Prof. Cook of the State Geological Survey, under the direction of Dr. W. Kitchell. Vol. 8, pp. 220–1.

Notices of remains of extinct vertebrated animals discovered by Proj. E. Emmons. Vol. 8, pp. 255–6.

Notice of some remains of Fishes discovered by Dr. John E. Evans. Vol. 8, pp. 256–7.

Notice of remains of two species of Seal. Vol. 8, p. 265.

Remarks on certain extinct species of Fishes. Vol. 8, pp. 301–2.

Notices of remains of extinct turtles of New Jersey, collected by Prof. Cook, of the State Geological Survey, under the direction of Dr. W. Kitchell. Vol. 8, pp. 303–4.

Notices of extinct Vertebrata discovered by Dr. F. V. Hayden during the expedition to the Sioux Country under the command of Lieut. G. K. Warren. Vol. 8, pp. 311–2.

1857.

List of extinct Vertebrata, the remains of which have been discovered in the region of the Missouri River; with remarks on their geological age. Vol. 9, pp. 89–91.

Notices of some remains of extinct Fishes. Vol. 9, pp. 167–8.

Rectification of the references of certain of the extinct mammalian genera of Nebraska. Vol. 9, p. 175.

Verbal, Dec. 1, on a large species of Gordius and a larva of Ostrea. Vol. 9, p. 204.

Verbal, Feb. 17, observations on Entozoa found in the Naiades. Vol. 9, p. 18.

Verbal, June 2, on Coprolites and Shales with Posodiniæ. Vol. 9, p. 149.

Verbal, June 16, on the new red sandstone fossils from the Gwynned tunnel, North Pa. R. R. Vol. 9, p. 150.

Verbal, Sept. 1, on the dentition of Mososaurus; also on Occanthus. Vol. 9, pp. 176–7.

Verbal, Dec. 22, on a curious animalcule found on stones and dead plants in the Schuylkill and Delaware rivers. Vol. 9, p. 204.

Verbal, Dec. 22, observations on the introduction of the camel into North America. Vol. 9, p. 210.

1858.

Verbal, Jan. 12, that the stomachs of Urnatella gracilis contained voluntary moving bodies, which might prove to be generative bodies. Vol. 10, p. 1.

Verbal, Jan. 19, that the extinct camel seemed to be about two-thirds the size of the recent species. Vol. 10, p. 2.

Verbal, Feb. 2, that the fossil remains from the Niobrara river belong to some twenty or more species which are distinct from those found in the Miocene of the Mauvaises Terres, as well as from those of a subsequent age. Vol. 10, p. 7.

Verbal, March 2, that with the collection of fossils received from the vicinity of Kansas river, were several masses of a yellowish magnesian limestone containing numerous

casts of a very peculiar group of fossils; that among the specimens found in the valley of the Niobrara river, Nebraska, is the lower jaw of a new species of Mastodon. Vol. 10, p. 10.

Verbal, March 9, that after inspecting numerous equine remains from Niobrara, he inclines to believe that the remains of the horse found in the Postpliocene deposits of the United States indicate two species. Vol. 10, p. 11.

Notices of remains of extinct vertebrata from the valley of the Niobrara River, collected during the exploring expedition of 1857, in Nebraska under the command of Lieut. C. K. Warren, U. S. Top. Eng., by Dr. F. V. Hayden, Geologist to the Expedition. Vol. 10, pp. 20–9.

Verbal, April 6, that in the collection from Niobrara two additional species of the ancient camel are indicated: Procamelus robustus and P. gracilis. He mentioned that fractured fossils are best mended by saturating them with melted beeswax. Vol. 10, p. 89.

Verbal, April 13, that he had named a fresh-water worm which lives in tubes of mud Manayunkia speciosa. Vol. 10, p. 90.

Contributions to Helminthology. Vol. 10, pp. 110–2.

Verbal, June 29, that one-half of the chrysalides of the canker-worm were infected by two species of Ichneumon. Vol. 10, p. 137.

Verbal, Nov. 2, that he and Dr. Bridges, in Lily pond, near Newport, R. I., had found a species of Cristatella. Vol. 10, pp. 188–90.

Verbal, Dec. 14, that the fossil bones obtained from Haddonfield, N. J., and given to him by Mr. Foulke for description, belonged to a huge extinct herbivorous Saurian, which he named Hadrosaurus Foulkii. Vol. 10, pp. 215–8.

1859.

Verbal, Jan. 11, that he had found the Manayunkia speciosa (a curious fresh-water worm, a drawing of which he exhibited) in great abundance at the foot of the cliffs washed by the ocean near Newport, R. I. Vol. 11, p. 2.

Verbal, Jan. 18, that from fossil remains of cartilaginous fishes, found in the carboniferous formations of Kansas, he had made three species. Vol. 11, p. 3.

Verbal, March 22, remarks on a Mastodon tooth from Tambla, Honduras; and teeth and fragments of teeth of Mososaurus from the green sand of New Jersey. Vol. 11, p. 91.

Verbal, April 12, in refereuce to ferruginous rock containing remains of fishes. Vol. 11, p. 110.

Verbal, April 19, in reference to fossil bones contained in so-called guano from Sombrero, W. I., which were exhibited. Vol. 11, p. 111.

Verbal, May 17, on specimens of Patæobrochus from subsilurian strata which he considered fossil, though its organic nature had been denied. Vol. 11, p. 150.

Verbal, Aug. 23, remarks on an antler of a reindeer, and on an animalcule, a drawing of which was submitted, found at Newport, R. I., named Freyia Americana. Vol. 11, p. 194.

1860.

Verbal, Feb. 11, that Albertite is a product from the distillation of bituminous coals or shales, and is perfectly amorphous. Vol. 12, p. 54.

Verbal, March 13, on Hyalomena from Japan. Vol. 12, p. 85.

Verbal, April 3, that experiments with Trichina spiralis, by Prof. Leuckart, of Giessen,

imply that the animal finds its way into the human body through food or drink. Vol. 12, p. 96.

Verbal, July 24, notice of a specimen of Hyla. Vol. 12, p. 305.

Verbal, Oct. 9, that the specimens of fossil bones from Washington Co., Texas, indicated a new equine genus, and a species of Hippotherium. Vol. 12, p. 416.

Verbal, Oct. 16, notice of an extinct Peccary. Vol. 12, p. 416.

1861.

Verbal, April 16, that lignite had been discovered at the border of the new red sandstone on Plymouth creek, near Norristown, Pa. Vol. 13, p. 77.

1862.

Verbal, Nov. 18, that he had noticed a boulder, apparently of Potsdam sandstone, at the corner of Thirty-seventh and Market streets, exposed by digging gravel, which is the largest transported block he had observed in our vicinity. Vol. 14, p. 307.

1863.

Verbal, Sept. 15, that he had found a Phalangopsis rolled in a leaf of a spice bush. Vol. 15, p. 212.

Verbal, Nov. 3, on specimens of Nostoc pruneiforme. Vol. 15, p. 281.

1865.

Verbal, May 23, that a boring sponge existed during the Cretaceous period. Vol. 17, p. 77.

Verbal, June 6, that fossil remains of horses had been found throughout the length and breadth of the North American continent. Vol. 17, p. 94.

Verbal, June 20, that he had found at Cape Henlopen, in a kitchen refuse heap, a clay pipe. Vol. 17, p. 95.

Verbal, Sept. 5, remarks on a fœtal dog-shark. Vol. 17, p. 175.

Verbal, Sept. 19, in reference to fossil bones of Rhinoceros. Vol. 17, p. 176.

Verbal, Oct. 10, remarks on specimens of oölitic phosphates of lime and alumina; also on human bones from a guano deposit on the Island Orchilla, W. I. Vol. 17, p. 181.

1866.

Verbal, Jan. 2, on part of a human skull of the so-called pigmy race, from near the mouth of Stone river, Tennessee. Vol. 18, p. 1.

Verbal, March 20, on a large phalanx of an extinct reptile; and stated that he was the first to discover the Trichina spiralis in the hog (while eating a slice of pork, he noticed some minute specks which recalled to mind the Trichina spots seen in the muscles of a human subject only a few days previously). Vol. 18, p. 9.

Verbal, May 22, that in the salt mine of the Island of Petite Anse, La., were grains of precious garnet, olivine, bones of the elephant, etc. Vol. 18, p. 109.

Verbal, June 5, in reference to a small collection of fossils from Bangor, Maine. Vol. 18, p. 237.

Verbal, Oct. 23, in reference to molar teeth of Mastodon ohioticus. Vol. 18, p. 290.

Verbal, Dec. 4, in reference to Drepanodon or Machairodus occidentalis, fragments of bones of which were shown. Vol. 18, p. 345.

1867.

Verbal, June 25, in reference to Bison antiquus. Vol. 19, p. 85.

Verbal, Sept. 10, on a fossil skull of Geomys bursarius. Vol. 19, p. 97.

Verbal, Sept. 17, on a fossil skull of Castoroides ohioensis. Vol. 19, p. 97.

Verbal, Oct. 1, in reference to specimens of black horustone exhibited. Vol. 19, p. 125.

1868.

Verbal, June 2, that some Sombrero guano contains ninety per cent. of phosphate of lime. Vol. 20, p. 156.

Notice of some vertebrate remains from Harden County, Texas. Vol. 20, pp. 174–6.

Indications of an Elotherium in California. Vol. 20, p. 177.

Notice of some reptilian remains from Nevada. Vol. 20, pp. 177–8.

Notice of some vertebrate remains from the West Indian Islands. Vol. 20, pp. 178–80.

Notice of some remains of Horses. Vol. 20, p. 195.

Notice of some extinct Cetaceans. Vol. 20, pp. 196–7.

Remarks on a jaw fragment of Megalosaurus. Vol. 20, pp. 197–200.

Remarks on Conosaurus of Gibbes. Vol. 20, pp. 200–2.

Notice of American species Ptychodus. Vol. 20, pp. 205–8.

Verbal, Oct. 20, that he found the stomach of a shad full of small fishes. Vol. 20, p. 228.

Notice of some American Leeches. Vol. 20, 229–30.

Notice of the remains of extinct Pachyderms. Vol. 20, pp. 230–2.

Verbal, Nov. 3, in reference to specimens seemingly of coprolites from the Huronian slates. Vol. 20, pp. 302–3.

Verbal, Nov. 3, that iridescence in opals is caused by striæ, 6000 to the inch. Vol. 20, p. 303.

Verbal, Dec. 1, on asterism in mica. Vol. 20, p. 313.

Notice of some remains of extinct Insectivora. Vol. 20, p. 315.

1869.

Notice of some extinct vertebrates from Wyoming and Dakota. Vol. 21, pp. 63–7.

1870.

Verbal, Jan. 4, description of Megacerops Coloradensis. Vol. 22, pp. 1, 2.

Verbal, Jan. 11, remarks on Poicilopleuron and other fossils submitted for examination by Prof. Hayden. Vol. 22, pp. 3–5.

Verbal, March 1, remarks on the right humerus of one of the extinct giant Sloths resembling Mylodon robustus, and on Dromotherium sylvestre, submitted for examination by the Smithsonian Institution. Vol. 22, pp. 8, 9.

Verbal, March 8, remarks on reptilian remains from the Cretaceous formation near Fort Wallace, Kansas, described by Prof. Cope under the name of Elasmosaurus platyurus. Vol. 22, p. 9.

Verbal, March 22, observations on ichthyodorulites, of which specimens were shown; on a metacarpal bone of Megalonyx Jeffersoni, and on a last lower grinder of Bison antiquus. Vol. 22, pp. 12–3.

Verbal, April 5, remarks on Discosaurus and its allies. Vol. 22, pp. 18–22.

Verbal, May 3, description of the internal generative organs of a hog, which were exhibited. Vol. 22, p. 65.

Verbal, May 17, remarks on some fossil bones from the Pliocene formation in the Mauvaises Terres of Dakota, which were shown. Vol. 22, pp. 65–6.

Verbal, June 14, observations on mammalian fossil remains, submitted for examination,

from Idaho, from Utah, and from Oregon; also, on Hadrosaurus and its allies. Vol. 22, pp. 66–9.

Verbal, Juue 21, notice of two fossil fragments ,belonging to Bison americanus and Elephas americanus. Vol. 22, pp. 69–71.

Verbal, July 5, remarks on differences between animals of the same species inhabiting Europe and Ameriea. Vol. 22, p. 72.

Verbal, July 12, remarks on a mutilated portion of the lower jaw of a large ruminant supposed to belong to Ovibos cavifrons. Vol. 22, p. 73.

Verbal, July 19, observations on a fossil, which he exhibited and named Nothosaurus occiduus. Vol. 22, p. 74.

Verbal, Aug. 2, description of Nephelis punctata, a new leech. Vol. 22, pp. 89–90.

Verbal, Sept. 20, account of a fossil crocodile, which he named Crocodilus Elliotti; remarks on Urnatella and Manayunkia. Vol. 22, pp. 100–2.

Verbal, Oct. 4, reference to a small collection of fossils from Wyoming, most of which pertain to Merycochœrus. Vol. 22, pp. 109–10.

Verbal, Oct. 18, remarks on some fossil remains which belong to Oreodon. Vol. 22, pp. 111–3.

Verbal, Oct. 25, observations in reference to several boxes of fossils from Fort Bridger, among which were Microsus cuspidatus and Notharctus tenebrosus, etc. Vol. 22, p. 113.

Verbal, Nov. 1, notice of Graphiodon vincarius. Vol. 22, p. 122.

Verbal, Nov. 8, descriptions of fossil species: Emys Jeanesi, Emys Haydeni, Baena arenosa, Saniwa ensidens. Vol. 22, pp. 123–4.

Verbal, Nov. 15, observations on fossils submitted for examination by Prof. J. D. Whitney, among which are fragments representative of the llama, camel, Hipparion and Protohippus. Vol. 22, pp. 125–7.

1871.

Verbal, Feb. 6, remarks on fossil bones from California. Vol. 23, p. 50.

Verbal, March 21, notice of Tænia canallata. Vol. 23, p. 53.

Verbal, April 18, observations on extinct turtles from Wyoming. Vol. 23, p. 102.

Verbal, May 9, remarks on polydactylism in a horse. Vol. 23, p. 112.

Verbal, May 16, observations on some fossil remains of Mastodon and horse in North Carolina; and of mammals from Wyoming. Vol. 23, pp. 113–6.

Verbal, June 5, on fossil Testudo of Wyoming; on supposed fossil turtle eggs; and on garnets from Green's creek, Delaware Co., Pa. Vol. 23, pp. 154–5.

Verbal, July 4, on some fossils from Fort Bridger. Vol. 23, p. 197.

Verbal, Aug. 1, on Mastodon remains from California; on Anchitherium. Vol. 23, pp. 198–9.

Verbal, Aug. 8, on fossil vertebrates from Wyoming. Vol. 23, pp. 228–9.

Verbal, Aug. 29, on extinct Rodents. Vol. 23, pp. 130–2.

Verbal, Oct. 10, on the minerals of Mount Mica. Vol. 23, pp. 245–7.

Verbal, Oct. 17, on fossils from Oregon. Vol. 23, pp. 247–8.

Verbal, Nov. 21, on the communication of contagion by flies. Vol. 23, p. 297.

Verbal, Dec. 12, on several worms. Vol. 23, pp. 305–7.

1872.

Verbal, Jan. 2, that Dr. C. S. Turnbull had found a mite on the membrana tympani of an ox. Vol. 24, p. 9. Named Gamasus auris, p. 138.

Verbal, Feb. 4, notices of Corundum, and of fossils from Wyoming. Vol. 24, pp. 19–21.

Verbal, April 2, in reference to extinct mammals from the Tertiary of Wyoming. Vol. 24, p. 37.

Verbal, April 9, in reference to fossils from Niobrara river. Vol. 24, p. 38.

Verbal, June 11, in reference to a Mastodon of New Mexico. Vol. 24, p. 142.

Verbal, July 2, on the genus Chisternon and some Cretaceous fishes. Vol. 24, pp. 162–3.

Verbal, July 9, on Artemia Salina from Salt Lake, Utah; and on fossil shark-teeth. Vol. 24, pp. 164–6.

Letter dated Fort Bridger, Uinta Co., Wyoming, July 24, 1872, from Dr. Leidy to Mr. G. W. Tryon, Jr., in reference to fossil mammals found there. Vol. 24, pp. 167–9.*

Verbal, Sept. 3, in reference to ants observed at Fort Bridger. Vol. 24, p. 213.

Verbal, Sept. 10, about mineral springs in Wyoming and Utah. Vol. 24, pp. 218–20.

Verbal, Oct. 1, in reference to a recently opened corundum mine in Chester Co., Pa. Vol. 24, pp. 238–9.

Verbal, Oct. 15, in reference to Uintatherium and other fossil remains; to chipped stones; a stone implement; and to the action of sand and wind on rocks of Wyoming. Vol. 24, pp. 240–3.

Verbal, Nov. 5, notice of fossils from Wyoming. Vol. 24, pp. 267–8.

Verbal, Dec. 10, notices of fossils from Wyoming. Vol. 24, pp. 277–8.

1873.

Verbal, Jan. 21, notice of fossil vertebrates from Virginia. Vol. 25, p. 15.

Verbal, Feb. 4, notice of remains of fishes in the Bridger Tertiary formation. Vol. 25, pp. 97–9.

Verbal, March 18, notice of an extinct hog found in the Pliocene sands of Niobrara river. Vol. 25, p. 207.

Verbal, April 1, notices of bituminous coal from Westmoreland, Pa.; of a black rat; and of a specimen of iron ore. Vol. 25, p. 257.

Verbal, April 15, notices of extinct mammals of California. Vol. 25, pp. 259–60.

Verbal, April 22, notice of a fungus parasite on a mouse. Vol. 25, p. 260.

Verbal, Oct. 14, notice of Distoma hepaticum. Vol. 25, p. 364.

Verbal, Dec. 9, notice of Lingula found in the stomach of a fish taken in the Susquehanna river. Vol. 25, p. 215.

Verbal, Dec. 16, notice of fossil elephant teeth. Vol. 25, pp. 216–7.

Verbal, Dec. 23, notice of intercellular circulation in plants, as in Vaucheria. Vol. 25, p. 420.

1874.

Verbal, Jan. 13, notice of Hydra, Vol. 26, p. 10.

Verbal, Feb. 3, notice of Protozoa. Vol. 26, pp. 13–5.

Verbal, Feb. 17, on the mode of growth of Desmids. Vol. 26, p. 15.

Verbal, March 24, on Actinophrys. Vol. 26, pp. 23–4.

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* Dr. Leidy sent a copy of this letter to The American Jour. of Science and Arts, because in it he referred to Elasmosaurus platyurus, Cope.

Verbal, April 21, on the enemies of Difflugia; and on a supposed compound derived from leather. Vol. 26, p. 75.

Verbal, May 12, notice of some new fresh-water Rhizopods. Vol. 26, pp. 77–9.

Verbal, June 16, observations on some fresh-water and terrestrial Rhizopods. Vol. 26, pp. 86–9.

Verbal, Aug. 25, observations on Pectinatella magnifica; on a parasitic worm which infests the house-fly; and on some fresh-water Infusoria. Vol. 26, pp. 139–40.

Verbal, Sept. 8, notice of a remarkable Amœba; its process or mode of swallowing. Vol. 26, pp. 162–3.

Verbal, Sept. 15, on the motive power of Diatomes. Vol. 26, p. 143.

Verbal, Sept. 22, on sponges. Vol. 26, p. 144.

Verbal, Oct. 5, notice of some Rhizopods. Vol. 26, pp. 155–7.

Verbal, Oct. 20, notice of Dryocampa. Vol. 26, p. 160.

Verbal, Nov. 10, notices of remains of Titanotherium; on supposed spermaries in Amœba; and of Rhizopods. Vol. 26, pp. 165–8.

Verbal, Dec. 15, notice of some fossils presented. Vol. 26, p. 223.

Verbal, Dec. 22, observations on Rhizopods. Vol. 26, pp. 225–7.

1875.

Verbal, Jan. 19, report of a fungus in a Flamingo. Vol. 27, p. 11.

Verbal, Feb. 2, account of some parasitic worms. Vol. 27, pp. 14–5.

Verbal, Feb. 9, notices of some nematoid worms. Vol. 27, pp. 17–8.

Verbal, March 16, observations on marine Rhizopods. Vol. 27, pp. 73–6.

Verbal, April 6, observations on a coal fossil; on elephant remains; and on Stephanoceros. Vol. 27, pp. 120–2.

Verbal, April 20, observations on a curious Rhizopod; on Psorosperms in a mallard duck; on a mouthless fish; and on Ouramœba. Vol. 27, pp. 124–7.

Verbal, Sept. 7, on Mermis acuminata. Vol. 27, p. 400.

Verbal, Oct. 4, observations on Rhizopods, and on Quercus heterophylla. Vol. 27, pp. 413–5.

1876.

Verbal, Jan. 4, observation on Petalodus. Vol. 28, p. 9.

Verbal, March 21, notice of Mastodon andium. Vol. 28, p. 38.

Verbal, April 11, remarks on Arcella. Vol. 28, pp. 54–8.

Verbal, May 9, remarks on fossils from the Ashley phosphate beds. Vol. 28, pp. 80–1.

Verbal, June 20, observations on vertebrate fossils from South Carolina. Vol. 28, p. 114.

Verbal, June 27, remarks on the rhizopod genus Nebela. Vol. 28, pp. 115–9.

Verbal, Oct. 10, on the structure of precious opal; and on Rhizopods. Vol. 28, pp. 195–9.

Verbal, Dec. 5, remarks on Ozocerite and Hyraceum. Vol. 28, pp. 325–6.

1877.

Verbal, Jan. 30, on the present contamination of the drinking water; on Eozoön canadense; and an instance in which the dome of the human diaphragm was elevated to a level of the anterior extremity of the first rib. Vol. 29, p. 20.

Verbal, April 3, remarks on the yellow ant. Vol. 29, p. 145.

Verbal, May 15, remarks on gregarines. Vol. 29, pp. 196–8.

Verbal, May 29, in reference to flukes which infest common fresh-water mollusks. Vol. 29, pp. 200–2.

Verbal, June 12, on parasitic Infusoria. Vol. 29, pp. 259–60.

Verbal, June 19, remarks on seventeen-year locust, the Hessian fly and a Chelifer. Vol. 29, pp. 260–1.

Verbal, June 26, accouut of the birth of a Rhizopod. Vol. 29, pp. 261–5.

Verbal, Sept. 4, remarks on the bedbug and its allies. Vol. 29, p. 284.

Verbal, Oct. 2, account of the Dinamœba's mode of feeding. Vol. 29, pp. 288–90.

Verbal, Oct. 9, remarks on the discrimination of a Heliozoön in selecting food. Vol. 29, pp. 291–2.

Verbal, Oct. 23, remarks on Rhizopods, and on fossil fishes. Vol. 29, pp. 293–4.

Verbal, Nov. 13, remarks on ants. Vol. 29, p. 304.

Verbal, Nov. 27, remarks on the American species of Difflugia. Vol. 29, p. 306.

Verbal, Dec. 18, notice of Rhizopods in an apple tree. Vol. 29, p. 321.

1878.

Verbal, Feb. 19, remarks on citrine or yellow quartz. Vol. 30, p. 40.

Verbal, March 5, on the tusk of hippopotamus; and on Amœba. Vol. 30, p. 99.

Verbal, March 26, remarks on lice found on the pelican. Vol. 30, p. 100.

Verbal, May 14, about parasitic worms of the shad. Vol. 30, p. 171.

Verbal, Aug. 27, that he had found Foraminifera in the sand about Cape May, Atlantic City, etc. Vol. 30, p. 292.

Verbal, Sept. 3, remarks on the black mildew of walls. Vol. 30, p. 331.

Verbal, Oct. 1, on foraminiferous shells on the New Jersey coast. Vol. 30, p. 336.

Verbal, Oct. 8, remarks on Crustaceans of Cape May. Vol. 30, p. 336.

Verbal, Oct. 15, notice of Tetrarhynchus. Vol. 30, p. 340.

Verbal, Nov. 12, on Donax fossor. Vol. 30, p. 382.

Verbal, Nov. 19, notice of the Gordius in the cockroach and leech. Vol. 30, p. 383.

Verbal, Dec. 3, on Tænia mediocanallata. Vol. 30, p. 405.

1879.

Verbal, Jan. 28, on Gordius; and on parasites of the rat. Vol. 31, pp. 10–1.

Verbal, Feb. 4, remarks on fossil remains of a Caribou. Vol. 31, pp. 42–3.

Verbal, Feb. 18, remarks on Bothriocephalus latus. Vol. 31, p. 40.

Verbal, June 17, statement in reference to Rhizopods in Sphagnum. Vol. 31, pp. 162–3.

Verbal, July 8, notice of fossil foot-tracks in the anthracite coal measures. Vol. 31, pp. 164–5.

Verbal, July 22, account of the explosion of a diamond. Vol. 31, p. 195.

Verbal, Sept. 5, remarks about some small animals on the coast of New Jersey. Vol. 31, p. 198.

Verbal, Sept. 30, on Cristatella Idæ. Vol. 31, p. 203.

Verbal, Oct. 7, on the Amœba Blattæ. Vol. 31, pp. 204–5.

1880.

Verbal, Jan. 20, remarks on specimens of Filaria immitis of the dog. Vol. 32, pp. 10–2.

Verbal, March 2, remarks on a species of Filaria, alleged to have been drawn from a man. Vol. 32, pp. 130–1.

Verbal, April 13, notices of pond life near Woodbury, N. J. Vol. 32, pp. 156–8.

Rhizopods in the mosses of the summit of Roan mountain, North Carolina. Vol. 32, pp. 333–40.

Verbal, Sept. 21, account of a visit to a bone cave near Stroudsburg, Pa. Vol. 32, pp. 346–9.

1881.

Verbal, Jan. 4, notice that Rhizopods are eaten by young fishes. Vol. 33, pp. 9–10.

1882.

Verbal, Jan. 3, remarks on some rock specimens. Vol. 34, pp. 10–2.

Verbal, Feb. 7, notice of Filaria in black bass. Vol. 34, p. 69.

Verbal, Feb. 28, remarks on his collection of Tourmalines, which he exhibited. Vol. 34, pp. 71–3.

Verbal, March 7, notice of Balanoglossus aurantiacus; and of Scolithus. Vol. 34, p. 93.

Verbal, April 4, remarks on Sagitta. Vol. 34, p. 102.

Verbal, May 2, remarks on some Entozoa found in birds; also on a coprolite and a pebble resembling an Indian hammer. Vol. 34, pp. 109–10.

Verbal, May 23, remarks on Bacillus anthracis; on Enchytræus, Distichopus and their parasites. Vol. 34, pp. 145–8.

Verbal, May 30, notice of the yellow ant. Vol. 34, p. 148.

Verbal, Sept. 5, remarks on Balanus. Vol. 34, p. 224–5.

Verbal, Sept. 26, remarks on a collection of tobacco worms, which he exhibited. Vol. 24, pp. 237–8.

Verbal, Oct. 17, notice of a new species of Pyxicola. Vol. 34, pp. 252–3.

Verbal, Oct. 31, remarks on Actinosphærium Eichornii. Vol. 34, p. 260.

Verbal, Nov. 7, notice of topaz and biotite. Vol. 34, p. 261.

Verbal, Nov. 14, on Actinosphærium, and Tubularia crocea. Vol. 34, pp. 261–2.

Verbal, Dec. 12, remarks on fossil remains of horses. Vol. 34, pp. 290–1.

Verbal, Dec. 19, remarks on an extinct peccary. Vol. 34, pp. 301–2.

1883.

Verbal, Feb. 12, remarks on the reproduction of Anodonta fluviatilis and its parasites. [Vol. 35], pp. 44–6.

Verbal, April 24, remarks on a social Heliozoan. [Vol 35], pp. 95–6.

Manayunkia speciosa. [Vol. 35], pp. 204–12, 24 figures.

Verbal, Dec. 11, notice of a fungus infesting flies; and remarks on Manayunkia. [Vol. 35], p. 302.

1884.

Verbal, Jan. 1, notice of an ant infested by a fungus; and of Cassiterite from Dakota. [Vol. 36], p. 9.

Verbal, Jan. 16, account of the effects of the storm, Jan. 8, on marine animals of the New Jersey coast. [Vol. 36], pp. 12–3.

Verbal, Jan. 29, remarks on a collection of fossil bones from Louisiana; and on Foraminifera in the drift of Minnesota. [Vol. 35], p. 22.

Verbal, Feb. 26, notice of Distoma and Filaria. [Vol. 35], p. 47.

Verbal, March 4, reference to Dictyophora and Apsilus vorax. [Vol. 35], p. 50.
Verbal, March 18, notice of Eumeces chalcides. [Vol. 35], p. 66.
Verbal, April 22, remarks on vertebrate fossils from Florida. Vol. 35, pp. 118–9.
Verbal, May 6, account of a rare human tapeworm. [Vol. 35], p. 137.
Verbal, May 13, description of Pentastomum proboscideum. [Vol. 35], p. 140.
Verbal, Oct. 28, notice of living organisms found in ice. [Vol. 35], p. 260.

1885.

Verbal, Jan. 13, notice of parasitic worms found in birds. [Vol. 36], pp. 9–11.
Verbal, March 10, notice of fossil remains of Rhinoceros and Hypotherium from Florida. [Vol. 36], pp. 32–3.
Verbal, March 24, remarks on fossil Mylodon. [Vol. 36], pp. 49–51.
Verbal, May 19, notice of Bothriocephalus in a trout. [Vol. 36], pp. 122–3.
Verbal, Dec. 22, notice of living worms in ice; Lumbricus glacialis. [Vol. 36], p. 408.

1886.

Verbal, Jan. 19, remarks on fossil bones of Mastodon and Llama from Florida. [Vol. 36], p. 11.
Verbal, Feb. 23, description of an extinct boar from Florida; and notice of caries in the Mastodon. [Vol. 36], pp. 37–8.
Verbal, March 23, notice of Amia and its probable Tænia. [Vol. 36], pp. 62–3.
Verbal, June 1, notice of Toxodon and other remains from Nicaragua. [Vol. 36], pp. 275–7.
Notices of Nematoid worms. [Vol. 36], pp. 308–13.

1887.

Notice of some parasitic worms. [Vol. 37], pp. 20–4.
Verbal, Feb. 1, notice of a parasite of a bat. [Vol. 37], p. 38.
Verbal, May 31, notice of Asplanchna Ebbesbornii. [Vol. 37], p. 157.
Verbal, Oct. 11, remarks on fossil bones from Florida. [Vol. 37], pp. 309–10.
Verbal, Oct. 25, remarks on Hydra. Vol. 37, pp. 310–3.
Verbal, Dec. 13, remarks on the bot-larvæ of the terrapin. [Vol. 37], pp. 393–4.

1888.

Verbal, Jan. 10, remarks on a fossil of the Puma. [Vol. 38], pp. 9–10.
Verbal, Feb. 14, notice of Chætopterus from Florida. [Vol. 38], p. 73.
Verbal, Feb. 28, notice of Lepas fascicularis; and of a tapeworm in a cucumber. [Vol. 38], pp. 80–1.
Verbal, March 20, notice of the habit of Cirolana concharum; and remarks on parasites of the striped bass. [Vol. 38], pp. 124–5.
Verbal, March, 27, notice of the Trematodes of the muskrat; remarks on Entozoa of the terrapin. [Vol. 38], pp. 126–8.
Verbal, April 3, notice of a Crustacean parasite of the red snapper. [Vol. 38], p. 138.
Distinctive characters of Odontapsis littoralis. [Vol. 38], pp. 162–4.
Parasitic Crustacea. Vol. 38, p. 165.
Verbal, May 1, notice of parasites of the Rockfish; and of the louse of the Pelican. [Vol. 38], pp. 166–8.

Verbal, May 8, notice of the parasites of the Pickerel. [Vol. 38], p. 169.

Verbal, Oct. 2, notice of anomalies of the human skull. [Vol. 38], p. 273.

Verbal, Nov. 27, remarks on the fauna of Beach Haven, N. J. [Vol. 38], pp. 329–33.

Verbal, Dec. 11, notice of the food of barnacles. [Vol. 38], p. 431.

1889.

Verbal, Jan. 1, remarks, with illustrations, on several gregarines, and a singular mode of conjugation of one of them. [Vol. 39], pp. 9–11.

Verbal, Feb. 19, remarks on a fossil remnant of the sabre-tooth tiger from Florida. [Vol. 39], pp. 29–31.

Verbal, March 5, notice of Gonyleptes and Solpuga. [Vol. 39], p. 15.

The Boring Sponge, Cliona. [Vol. 39], pp. 70–5.

Verbal, April 16, notice of a parasitic Copepod. [Vol. 39], p. 95.

Verbal, April 23, remarks on fossil vertebrates from Florida. [Vol. 39], pp. 96–7.

1890.

Verbal, March 4, notice of Hypoderas in the Little Blue Heron; and of an ichneumon fly. [Vol. 39], p. 63.

Verbal, March 25, remarks on fossil vertebrates from Florida. [Vol. 39], p. 64.

Verbal, May 20, remarks on Hippotherium and Rhinoceros from Florida. [Vol. 39], pp. 182–3.

Verbal, May 27, remarks on Mastodon and Capybara of South Carolina. [Vol. 39], pp. 184–5.

Verbal, Sept. 23, remarks on Ticks. [Vol. 39], pp. 278–80.

Verbal, Sept. 30, notice of parasites of Mola rotunda. [Vol. 39], pp. 281–2.

Verbal, Oct. 7, notice of Beroe on the New Jersey coast. [Vol. 39], p. 341.

Notices of Entozoa. [Vol. 39], pp. 410–8.

Verbal, Nov. 11, notice of Velella. [Vol. 39], p. 408.

1891.

Verbal, Feb. 17, notice of the Boring Sponge of the Oyster. [Vol. 40], p. 122.

Notice of some Entozoa. [Vol. 40], pp. 234–6.

Dr. Leidy presided for the last time at the meeting of April 14.

Many of the above communications were copied by foreign and domestic periodicals, and the substance of many of them he included in elaborate essays on the same subjects.

TRANSACTIONS OF THE WAGNER FREE INSTITUTE OF SCIENCE OF PHILADELPHIA.
[Small Quarto.]

Notice of some fossil human bones. Vol. 2, pp. 9–12, 2 plates, Dec., 1889.

Description of Mammalian remains from a rock crevice in Florida. Vol. 2. pp. 15–7, 2 plates, Dec., 1889.

Description of Vertebrate remains from Peace Creek, Florida. Vol. 2, pp. 19–31, 2 plates, Dec., 1889.

Notice of some Mammalian remains from the salt mine of Petite Anse, Louisiana. Vol. 2, pp. 33–40, 1 plate, Dec., 1889.

On Platygonus, an extinct genus allied to the Peccaries. Vol. 2, pp. 41–50, Dec., 1889.
Remarks on the nature of Organic Species. Vol. 2, pp. 51–3.

Miscellaneous.

Notice of the formation of some crystalline bodies in Collodion. Amer. Jour. Pharmacy, Vol. 16, pp. 24–6, 1850.

Remarks on some curious Sponges. American Naturalist, Vol. 4, pp. 17–22, 12 figures, 1871.

In Science :

Study of the temporal bone. Illustrated. Vol. 1, Part 1, pp. 380–5 ; Part 2, pp. 475–7 ; Part 3, pp. 506–7, 1883.

Crystals in the bark of trees. Illustrated. Vol. 2, pp. 707–8, 1883. Manayunkia is noticed p. 762.

The Journal of Comparative Medicine and Surgery. [Dr. Leidy was one of its collaborators in the department of Comparative Anatomy and Physiology] :

Tapeworm in Birds. Vol. 8, pp. 1–11, 27 figures, Jan., 1887.

Parasites of the Shad and Herring. Vol. 9, pp. 211–5, July, 1888.

Addresses by Dr. Joseph Leidy.

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Sketch – Joseph Leidy